COPY #4 OLIN CORPORATION RESEARCH CENTER P.O. BOX 586 350 KNOTTER DRIVE CHESHIRE, CT 06410 **OCTORER** 

### MARILYN G. MILLER

Cheshire Part B Permit
Application

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## RESEARCH CENTER 350 KNOTTER DRIVE, P.O. BOX 586 CHESHIRE, CT 06410-0586 (203) 271-4000

October 31, 1988

U. S. Environmental Protection Agency Region 1 Waste Management Division John F. Kennedy Federal Building Boston, MA 02203

Attention:

Connecticut Waste Permits Section

(HER-CAN 6)

Gentlemen:

Re: Hazardous Waste Facility Permit Application

Olin Corporation

Cheshire Research Center

350 Knotter Drive, P. O. Box 586

Cheshire, CT 06410-0586

EPA, I.D. No. C.T.D. 0980916779

Olin Corporation is submitting a hazardous waste facility permit application for existing hazardous waste storage areas. This submission consists of a revised Part A permit application and a Part B permit application. The revision adds additional listed wastes for storage.

If you have any questions, please call Jim Dreyfuss at (203) 271-4202, Cheshire, CT.

Sincerely,

C. G. Seefried

Director of Research

WA ALMA

CGS

cc: CT DEP

Marilyn G. Miller - Olin Stamford

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Director of Research

CGS

CT DEP cc:

Marilyn G. Miller - Olin Stamford

### 270.11(d) 270.11(a) Permit Application Certification and Signature

Re: Olin Corporation P.O. Box 586 350 Knotter Dr. Cheshire, CT 06410

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

C. S. Seefpied

Director of Research mem

Date: 114/88



## RESEARCH CENTER 350 KNOTTER DRIVE, P.O. BOX 586 CHESHIRE, CT 06410-0586 (203) 271-4000

October 31, 1988

State of Connecticut
Department of Environmental Protection
Hazardous Waste Management Section
165 Capitol Avenue
Hartford, CT 06101

Attention: Stephen Hitchcock, Director

Gentlemen:

Re: Hazardous Waste Facility Permit Application

Olin Corporation

Cheshire Research Center

350 Knotter Drive, P. O. Box 586

Cheshire, CT 06410-0586

EPA, I.D. No. C.T.D. 0980916779

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### U.S. ENVIRONMENTAL PROTECTION AGENCY HAZARDOUS WASTE PERMIT APPLICATION

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A. NAME (print or type)

B. SIGNATURE

C. DATE SIGNED





### STATE OF CONNECTICUT RCI

RECEIVED

MAY 1 0 1988

N. G. MILLER

May 10, 1988

Ms. Marilyn G. Miller Senior Environmental Specialist Olin Research Center 350 Knotter Drive Post Office Box 586 Cheshire, Connecticut 06410-0586

Dear Ms. Miller:

This letter is to acknowledge Olin's Part 'A' application signed 3/3/87 was received by the Department of Environmental Protection on March 10, 1987.

A Part 'B' permit application will be due on or before November 8, 1988 as required by HSWA. You will be receiving further correspondence regarding submittal of a Part 'B'.

Very truly yours,

Barry/L/. Giroux

Principal Sanitary Engineer

Hazardous Waste Management Section

BLG:et



#### CERTIFIED MAIL RETURN RECEIPT REQUESTED

March 14, 1988

Mr. Barry Giroux, Supervisor Dept. of Environmental Protection Hazardous Waste Management Section 165 Capitol Avenue Hartford, CT 06106

Dear Mr. Giroux:

Please find a copy of a Part A application submitted to you on March 6, 1987. As of this date we have not received an acknowledgement of this application, and we would like to proceed with a Part B application some time this year. Could your department respond to this request.

Please respond to Ms. Marilyn G. Miller, Senior Environmental Specialist at 356-2056 if you have any questions.

Sincerely yours,

James A. Dreyfuss Facilities Manager MGM

JAD/ds

### 270.14(b)(1) Facility Description

One existing hazardous waste storage facility is located at Olin Research Facility, 350 Knotter Drive, P.O. Box 586, Cheshire, CT 06410-0586.

The facility stores hazardous waste in containers generated from research projects, and occasionally off-site wastes are accepted from other Olin facilities, prior to the wastes being shipped off-site for treatment disposal, reuse or recycle. No treatment or disposal of hazardous wastes takes place on-site.

The existing storage area is capable of storing 5,500 gallons of hazardous wastes in containers of various sizes and types.

Laboratory packs of small containers of compatible laboratory chemicals packaged in absorbant in large shippable containers are stored, as well as 55 gallon drums and smaller containers awaiting consolidation or lab packing.

270.14(b)(2) Chemical and Physical analysis of hazardous wastes stored at Cheshire Research

Before storage takes place at Cheshire, a chemical and physical analysis of the waste is provided to the environmental officer by the project or chemist generating the waste material.

What follows are the general groups of wastes that have been typically stored in Cheshire and the information needed to store the wastes until disposal takes place off-site. See attachment 270.14(b)(2)1

Also, please find representative waste information forms that have typically been generated for those wastes in the past. See attachment 270.14(b)(2)2

These forms are used to properly store the wastes before shipment off-site and are used with off-site disposal firms to determine method of disposal as well as recovery or treatment necessary to comply with their permit and the appropriate regulations.

Waste Name	EPA #	Test Parameter	Sampling Freq. and Procedure	Quantity Produced Annually
Miscellaneous solvents from experiments	F002 F003 D001	Flash point Pensky Martens TOC TCLP Liquid	prior to shipment coliwasa	1,500 gal.
Aqueous Acids from titrations	<b>D</b> 0.02	ph EP toxicity	coliwasa prior to shipment	500 gal.
Lab packed chemicals	D001 D002	Compatibility Liquids EP Toxicity	case by case basis	2,500 lbs.
Misc. Swimming Pool chemicals	D001	Compatibility Oxidizer	trier or thief compatibility test prior to storage	500 lbs.
Hydrofluoric	D002	ph	coliwasa	100 gal.
Acid - Clean Room	U134	Liquid	prior to shipment	
Toluene Diisocyanate	D003	(% NCO Free TDI) Liquid	*determined on case by case prior to shipment	500 lbs.
Mis. Gas Cylinders	D001 D002	GC Mass Spec.	<pre>prior to shipment off-site</pre>	150 lbs.

<sup>\*</sup>Wastes can exist in varying physical states, inspection necessary at the time of sampling.

# Olin CHEMICALS WASTE INFORMATION FORM

Contract Service Exhibits	vices Use UnlyPageof
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	WASTE I	nformation form	Deta	
Generating Facility  Address  24 Science Facility  Generating Process R&D	August 14, 19 NEW HAVEN /cheshire Park / Knotter Drive -CHLORINATED-HI BTU SOLV	Contact W. N. Pa	789-6253	80916779
Waste Name NON-		<del></del>	te Code F003	
WASTE CATEGORY: (Use most descriptive combination)	[xk Organic [] Inor	] Cyanide [ ] Preciou	de [] Hal mate <b>[]</b> Land is Metal Bearing	ogenated  1 Ban Restricted  [ ] Wastewater
Specific Gravity 7-8 1b/ Physical State Liquid ( Flashpoint 10-20	RISTICS: Color lack  G Heating Value 10,000 B  70° F) Ash Content N  F [] Open Cup [X] Close  [] Multi-layered [] Bi-layered	TU/LEVapor Pressure N <sub>7</sub> i/A d Cup	Free Liquid 1 A Viscosity L	00 <b>% pH</b> 5-
CHEMICAL COMPOSIT ACETONE ISOPARAFFIN NAPHTHA METHANOL POLYOL PUMP OIL CHLOROFORM NZENE LUENE	$\begin{array}{c c} & & & \\ \hline & 0 & & \\ \hline & 0 & & \\ \hline & & 3 & \\ \end{array}$	y [X] Estimate METALS  Arsenic BNP  Barium BNP  Cadmium BNP  Chromium BNP  OTHER COMPONE  Copper BNP  Nickel BNP  Zinc BNP  TCLP Analysis []	* Lead Mercury Selenium Silver NTS-TOTAL (ppm Cyanides Sulfides Phenolics PCBs	BNP BNP BNP BNP BNP BNP
HAZARDOUS CHARAC		HAZARD R	ATING Heal th	3
[ ] Explo	[] Pyrophoric [] Shock osive [] Water Reactive [ [] Irritant [] Low [X]	] Other	Special Instruct	
DISPOSAL/SHIPPING I Disposal Method				
UN-NA UN 1993		nzard Class FLAMM	MABLE LIQUID	55 gallon
Special Handling Instruc	tions			
Expected Quantity	[X] AI	nually [] Quarterly []	Monthly [] Weekl	y [] One time
suspected hazards have that have the hard hard hard hard hard hard hard hard				•
APPROVALS: Prepared by W.N.F	Patterson W. Patters		9/87	

## Clin CHEMICALS WASTE INFORMATION FORM

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GL. ERAL INFORMATION: Date 6/24/87  Generating Facility NEW HAVEN Address 24 SCIENCE PARK/Knotter Drive Generating Process R&D Waste Name AQUEOUS ACIDS	Olin Control No. NH-79A  EPA I.D. No. CTD 001451004/980916779  Contact W. N. Patterson Phone (203) 789-6253  EPA or State Waste Code D002
WASTE CATEGORY: [] Organic [Xk Inorganic (Use most descriptive [] Sulfonated [] Organopho combination) [Xk Acid [] Alkali [] Cya [] Radioactive [] Etiological	osphate [] Carbamate M Land Ban Restricted inide [] Precious Metal Bearing 13 Wastewater
PHYSICAL CHARACTERISTICS: Color Black Specific Gravity 0.85 Heating Value N/A Physical State Liquid (70°C) Ash ContentN/A Flashpoint N/A °F [] Qpen Cup [] Closed Cup Layers: XX No layering [] Multi-layered [] Bi-layered	
C   C   C   C   C   C   C   C   C   C	Estimate METALS: [] Total(ppm) [] EP Extract(mg/l) rsenic BNP* Lead BNP arium BNP Mercury BNP admium BNP Selenium BNP hromium BNP Silver BNP THER COMPONENTS-TOTAL (ppm) opper BNP Cyanides < 25 ppb lickel BNP Sulfides BNP inc BNP Phenolics BNP hallium BNP PCBs BNP CLP Analysis [] Yes NO [] Attached
HAZARDOUS CHARACTERISTICS:  REACTIVITY: [ None [ ] Pyrophoric [ ] Shock Sensit [ ] Explosive [ ] Water Reactive [ ] Oth TOXICITY: [ ] None [ ] Irritant [ ] Low [ ] Mode	er 🔻 🗡
DISPOSAL/SHIPPING INFORMATION:  Disposal Method Neutralization.  DOT Proper Shipping Name WASTE ACID, LIQUID  UN-NA NA 1760 DOT Hazard (  Packaging: [] Bulk [] Drums(Metal) [] Drums(Fiber)  Special Handling Instructions	Class CORROSIVE MATERIAL  [X] Other PLASTIC DRUMS Size 55 GAL
	Q [ ] Quarterly [ ] Monthly [ ] Weekly [ ] One time attached is complete and accurate, and that all known or Date 7/3/87  Date 8/7/87

\*BNP = Believed Not Present



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WASIE	INFORMATION FORM	Waste Code
GENERAL INFORMATION: Date 5/2/88	Olin Control No.	NH_02
enerating Facility Cheshire/New Haven		
Address 24 Science Park/Knotter	Drive Contact	W.N.Patterson
Generating Process R&D	Phone	(203) 780-6253
Waste Name MISCELLANEOUS LABORATORY SAMPL	ES PACKED IN VERMICULIT	'E
EPA or State Waste Code D001, D002, D003, D0	04. D005. D006. D006. D	0007, D008, D009
******************************	**************	************
combination) [x] Acid [] Alkali [] Radioactive [] Etiological []	[X] Cyanide [ ] Precious gical [X] Solvent	(文) Halogenated ate 「文列 Land Ban Restricted Metal Bearing [ ] Wastewater
PHYSICAL CHARACTERISTICS: Color N/A Specific Gravity N/A Heating Value N/A Physical State Solid (70°F) Ash Content	Odor None Vapor Pressure N/A	Free Liquid None % pH 2-12 Viscosity N/A , cks
Flashpoint $\langle x \rangle_{140}$ F [] Open Cup [x] Clos Layers: [] No layering [x] Multi-layered [] Bi-layers	sed Cup	
Easters [] No tayering [X] Mutu-tayered [] bi-tayers.	ayered Comments.	
CHEMICAL COMPOSITION: [ ] Analysis [x] History		
DESCRIPTION AND QUANTITY OF	Arsenic	
MATERIAL LISTED ON A PACKING	Barium IP	Mercury IP
SLIP AND SUBMITTED FOR	Cadmium IP IP	Selenium IP Silver IP
APPROVAL REFORE FACH SHIPMENT	OTHER COMPONEN	
	Copper IP	
	Nickel IP	
		Phenolics IP
	Thallium IP	PCBs IP
<u> </u>	TCLP Analysis [] Yo	
HAZARDOUS CHARACTERISTICS: As requi	red on packing slip	HAZARD RATING
in requi	ince on passage - 1	Flammability
REACTIVITY: [] None [] Pyrophoric [] Shoc [] Explosive [] Water Reactive TOXICITY: [] None [] Irritant [] Low [	[] Other	Health 3 3 Reactivity
DISPOSAL/SHIPPING INFORMATION: Disposal Method Incineration		
DOT Proper Shipping Name As required		
DOT Hazard Class As required UN	-NA As required	RO As required
Packaging: [] Bulk [1] Drums(Metal) [] Drums Special Handling Instructions		Size 55 gal.
	annelly (1 Overteely (1)	footbly [] Waskly [] One time
Expected Quantity 100 [x]	unually [] Quarterly [] K	Monthly [] Weekly [] One time
CERTIFICATION: I hereby certify that all information submitted about	ye and attached is complete	and accurate, and that all known or
suspected hazards have been disclosed.  Authorized Signature W. N. Patterson	There 5/3/85	_
Title Environmental Affairs Officer	Date 5/3	/88
	****************	
PPROVALS:	ually Date	5/3/88
AD Disposal Approved by R.S. Hendey All I Additional Information Attached		
[] Additional Information Attached  [] On  BNP - Believed Not Present  NA - Not App	••	
Form CSD-WOI Revised 8/87	F-	esent will be noted on cking slip

ULIN CURPORATION (CHESHIRE, CT)

PACKING LIST FOR LABORATORY WASTE

DATE

FLAMMABLE 205 LIQUID I NO. COMPATIBILITY CODE D.O.T. CLASS WASTE MATERIAL-QTY. UNIT URETHANE POLYMER-ACETONE-METHANOL-ETHANOL MIXTURE TOTALING 1 GAL 3 ISOPARAFFIN-NAPTHA-ETHANOL-ACETONE-PIPETTES TOTALING 1 GAL ACETONE-DOP-GLASS & PAPER TOTALING 1 PT 3 AMINE CATALYST DIOETHYLENEOLEATE TETRAETHYLENE GLYCOL DIACRYLATE **PIPETTES** TOTALING 1 PT METALWORKING FLUID. 500 TOTALING 5 GAL 500 95% H<sub>2</sub>O-BENZENE-TOLUENE-XYLENE MIXTURE TOTALING 1 GAL. 1 PAPER CEMENT-TOWELS-PLASTIC BAGS 8 OZ 1 ACETONE-ISOPROPANOL-TOLUENE-POLYAGRYLONITRITE 1 QT .. H<sub>2</sub>0-POLY(VINYLPHOSPHONIC) ACID 1.PT TRIETHANOL AMINE PHOSPHATE ESTER 1 QT SILICONE IMPREGNATING VARNISH 1 PT . GLYCOPURANOSYL BROMIDE TETRABENZOATE TOTALING · 4 GMS ACRYLONITRILE 100 GMS H<sub>2</sub>O-PHENOL 4 OZ 90% H<sub>2</sub>0-SODIUM CITRATE AMMONIUM CHLORIDE-SODIUM EDTA MIXTURE 2 TOTALING . 8 OZ POLYMALEIC ACID. TOTALING 1 PT SURFACTANT TOTALING 8 OZ HYDROXYETHANE DIPHOSPHONIC. ACID TOTALING 8 OZ NITRILOTRIPHOSPHONIC ACID TOTALING 8 OZ · POLYOL TOTALING 4 OZ PUMP OIL 1 OZ POLY (ALKOXYPHOSPHAZINES) TOTALING · 4 OZ

### Olin CHEMICALS WASTE INFORMATION FORM

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WASTE INFO	RMATION FORM	Date
GENERAL INFORMATION: Date 7/13/87  Generating Facility NEW HAVEN  Address 24 SCIENCE PARK/Knotter Drive  Generating Process R&D  Waste Name WASTE HTH SAMPLES	Olin Control No.  EPA I.D. No.  CTD  Contact  Phone  (20)  EPA or State Waste C	NH-197 001451004/980916779 N. Patterson 3) 789-6253 Code D001
WASTE CATEGORY: [] Organic [x] Inorganic (Use most descriptive [] Sulfonated [] Organoph combination) [] Acid [] Alkali [] Cytellogical [] Radioactive [] Etiological	anide [] Precious M [] Solvent	[] Halogenated e [] Land Ban Restricted letal Bearing [] Wastewater
PHYSICAL CHARACTERISTICS: Color White  Specific Gravity 2.20 Heating Value N/A  Physical State SOLID (70°C) Ash Content N/A  Flashpoint N/A °F [] Open Cup [] Closed Cup  Layers: [X] No layering [] Multi-layered [] Bi-layered	Odor Chlorine Vapor Pressure N/A	Free Liquid 0 % pH N/A Viscosity N/A
CONTAINERS ( - ) C ( -	Arsenic BNP * Barium BNP Cadmium BNP Chromium BNP OTHER COMPONENTS Copper BNP Vickel BNP Linc BNP Challium BNP	Lead         BNP           Mercury         BNP           Selenium         BNP           Silver         BNP           S-TOTAL (ppm)
HAZARDOUS CHARACTERISTICS:  REACTIVITY: [] None [] Pyrophoric [] Shock Sensi [] Explosive [X] Water Reactive [] Oth TOXICITY: [] None [X] Irritant [] Low [] Mode	ner erate [] High	Heal th 2 0 2 Reacti
DISPOSAL/SHIPPING INFORMATION: Disposal Method Water treatment.  DOT Proper Shipping Name WASTE CALCIUM HYPOCHLOR	ITE MIXTURE, DRY	
UN-NA UN 1748 DOT Hazard Packaging: [] Bulk [x] Drums(Metal) [] Drums(Fiber Special Handling Instructions	Class OXIDIZER ) [ ] Other	Size 55 gal overpack
CERTIFICATION: I hereby certify that all information submitted above and suspected hazards have been disclosed. luthorized Signature W.N.Patterson W. Patterson W	*************	onthly [] Weekly [] One time and accurate, and that all known of
Prepared by W.N. Patterson W.N. Patt	Date 7/13/5	7

	CONTROL NO. NH-171	CONTRACT SERVICES USE ONLY Exhibit # Page of Contract # CS- Date Contractor
	DATE	Waste Code
	Generating Facility  New Haven  Address  24 SCIENCE PARK/Knotter Drive  Generating Process CHESHIRE CLEAN ROOM	EPA I.D. No. CTD 001451004/980916779  Contact W. N. Patterson Phone (203) 271-4258
	Weste Name CLEAN ROOM ACID WASH	EPA or State Waste Code D002
		Class Corrosive Material
	Packaging: [] Buik [] Drums(Metal) [] Drums(Fiber Special Handling Instructions	) [X Other Plastic Drums Size 55 gal.
	Expected Quantity/Units 310 gal/month	k Annually Monthly [] One Time
	WASTE CATEGORY: [] Organic [] Inorganic [] Organoph combination)	[] Pesticide [] Halogenated
	GENERAI, CHARACTERISTICS: Color Colorless  Physical State @ 25°C [] Bilayered [] Multilaye [] Solid KJ Liquid	Odor Pungent Free Liquid 100 % red [] No layering [] Gas [] Semi-solid [] Ot
)	Sulfuric Acid       (8.0 - 20         Hydrofluoric Acid       (2.0 - 5         Hydrogen Peroxide       (0.05 - 1         Anmonium Fluoride       (3.0 - 5         Eilicon       - <20         Thosphorous       - <20	Description   Description
	TOXICITY: None Irritant Low Moderate High [] FX [] [] FX Addition toxicity data on reverse []	HAZARD RATING Flammbility COMMENTS  Health  Reactivity
•	REACTIVITY: [x] None [] Pyrophoric [] Explos [] Water Reactive [] Shock Sensitive [] Radioactive	
	Remarks Wear special protective clothing when	
. )	Method of Disposal Water Treatment, including No Prepared by: W.H. Johnson Water Treatment, including No Prepared by: W.N. Patterson Will for These EAD Disposal Approval by: KS Lenden	Date 3/26/87  -EAO Date 3/26/87  -Mgr., NE Date 6/29/87
	R.S. Hendey Form CSD-WOI - Rev. 3/86 Additional Information	Env. Affairs ion: [] Attached [] Reverse

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WASTE INFORMATION FORM
GENERAL INFORMATION: Date 6/24/87 Olin Control No. NH-188 Generating Facility NEW HAVEN EPA I.D. No. CTD 001451004/980916779 Address 24 SCIENCE PARK/Knotter Drive Generating Process ACID FILTRATION Phone (203) 789-6253 Waste Name HYDROFLUORIC ACID EPA or State Waste Code U134
WASTE CATEGORY: [] Organic XX Inorganic [] Pesticide [] Halogenated  (Use most descriptive [] Sulfonated [] Organophosphate [] Carbamate [] Land Ban Restricted combination)  XX Acid [] Alkali [] Cyanide [] Precious Metal Bearing [] Wastewater [] Radioactive [] Etiological [] Solvent
PHYSICAL CHARACTERISTICS: Color Colorless Odor Fuming Free Liquid 100 % pH < Specific Gravity 0.988 Heating Value N/A Vapor Pressure N/A Viscosity Low Physical State Liquid (70°C) Ash Content N/A Flashpoint N/A °F [] Open Cup [] Closed Cup Layers: XX] No layering [] Multi-layered [] Bi-layered [] Single
CHEMICAL COMPOSITION: [] Analysis [] History XX] Estimate         METALS: [] Total(ppm) [] EP Extract(mg HYDROGEN FLUORIDE           HYDROGEN FLUORIDE         — 49%         Arsenic         BNP *         Lead         BNP           WATER         — 51%         Barium         BNP         Mercury         BNP           METALS: [] Total(ppm)         Mercury         BNP         BNP           METALS: [] Total(ppm)         BNP         Mercury         BNP           METALS: [] Total(ppm)         Mercury         BNP           Mercury         BNP         BNP           Cyanides         BNP           Mercury         BNP         Cyanides         BNP           Mercury         BNP         Cyanides         BNP           Mercury         BNP         Cyanides         BNP           Mercury         BNP         Cyanides         BNP           Mercury         BNP
HAZARDOUS CHARACTERISTICS:  REACTIVITY: M None [] Pyrophoric [] Shock Sensitive [] Explosive [] Water Reactive [] Other  TOXICITY: [] None [] Irritant [] Low [] Moderate M High  Special Instructions
DISPOSAL/SHIPPING INFORMATION: Disposal Method Neutralization
DOT Proper Shipping Name WASTE HYDROFLUORIC ACID SOLUTION UN-NA UN 1790 DOT Hazard Class CORROSIVE MATERIAL Packaging: [] Bulk [] Drums(Metal) [] Drums(Fiber) XK] Other PLASTIC DRUMS Size 15 GAL Special Handling Instructions Highly corrosive to skin and mucous membranes.
Expected Quantity 2-5 X[X] Annually [] Quarterly [] Monthly [] Weekly [] One time
CERTIFICATION:  I hereby certify that all information submitted above and attached is complete and accurate, and that all known suspected hazards have been disclosed.  Authorized Signature W.N. Patterson W.N. Patterson Date  *le Environmental Affairs Officer Date  APPROVALS:  APPROVALS:
Prepared by W.N. Patterson W.N. Patterson Date  EAD Disposal Approved by K.S. Steudey Date 8/7/87  *BNP = Believed Not Present

\* Additional Information Attached [1] MSDS Attached



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GENERAL INFORMATION: Date 7/13/87	Olin Control No. NH-33
Generating Facility NEW HAVEN	EPA I.D. No. CTD 001451004/980916779
Address 24 SCIENCE PARK / Knotter Driv	Contact W. N. Patterson
Generating Process R&D	Phone (203) 789-6253
and the same of th	EPA or State Waste Code U223
***************************************	
WASTE CATEGORY: A Organic [] Inorgan (Use most descriptive [] Sulfonated [] Organo combination) [] Acid [] Alkali [] Radioactive [] Etiologica	ophosphate [] Carbamate xk] Land Ban Restricted Cyanide [] Precious Metal Bearing [] Wastewater
PHYSICAL CHARACTERISTICS: Color Yellow	Odor Pungent Free Liquid 100 % pH 6-
Specific Gravity 1.22 Heating Value 10000 BTU	Vapor Pressure 0.01 mm Viscosity Low
Physical State Liquid (70°C) Ash Content N/A	
Flashpoint 270 °F [] Open Cup [] Closed C	Cup
Layers: KI No layering [] Multi-layered [] Bi-layer	ed [] Single
	. H I N H J J J J J J J J J J J J J J J J J J
CHEMICAL COMPOSITION: [] Analysis [X]k History	[] Estimate METALS: [] Total(ppm) [] EP Extract(mg/
TDI IN ONE OUNCE TO ONE GALLON - 100%) BOTTLES AND CANS PACKED IN ( - )	
JANDUSI ()	Cadmium BNP Selenium BNP Chromium BNP Silver BNP
	OTHER COMPONENTS-TOTAL (ppm)
	Copper BNP Cyanides BNP Nickel BNP Sulfides BNP
	Zinc BNP Phenolics BNP
	Thallium BNP PCBs BNP
	TCLP Analysis [] Yes XX No [] Attached
医骶骨囊 医乳球蛋白 医乳球 医乳球 医乳球 医甲状腺 医甲状腺 医神经 医神经 医神经 医神经 医神经	
HAZARDOUS CHARACTERISTICS:	HAZARD RATING
	Neelth 1
REACTIVITY: [] None [] Pyrophoric [] Shock Ser	nsitive (3×1)
[] Explosive XX Water Reactive [] (	
TOXICITY: [] None [] Irritant [] Low [] Mo	nderate KM High Special Instructions
•	
, #####################################	
DISPOSAL/SHIPPING INFORMATION:	
DISPOSAL/SHIPPING INFORMATION: Disposal Method Incineration	
Disposal Method <u>Incineration</u>	
Disposal Method <u>Incineration</u> DOT Proper Shipping Name WASTE TOLUENE DIISOC	CYANATE
DOT Proper Shipping Name WASTE TOLUENE DIISOCUN-NA UN 2078 DOT Hazar	CYANATE POISON B
DOT Proper Shipping Name WASTE TOLUENE DIISOCUN-NA UN 2078 DOT Hazar Packaging: [] Bulk [] Drums(Metal) [] Drums(Fib	CYANATE POISON B
DOT Proper Shipping Name WASTE TOLUENE DIISOCUN-NA UN 2078 DOT Hazar	CYANATE POISON B
DOT Proper Shipping Name WASTE TOLUENE DIISOCUN-NA UN 2078 DOT Hazar Packaging: [] Bulk [] Drums(Metal) [] Drums(Fib Special Handling Instructions	CYANATE  rd Class POISON B  er) [] Other Size 20 gallon
DOT Proper Shipping Name WASTE TOLUENE DIISOCUN-NA UN 2078 DOT Hazar Packaging: [] Bulk [] Drums(Metal) [] Drums(Fib Special Handling Instructions	CYANATE POISON B
DOT Proper Shipping Name WASTE TOLUENE DIISOCUN-NA UN 2078 DOT Hazar Packaging: [] Bulk [] Drums(Metal) [] Drums(Fib Special Handling Instructions  Expected Quantity 12 [] Annual CERTIFICATION:	CYANATE  rd Class POISON B  er) [] Other Size 20 gallon
DOT Proper Shipping Name WASTE TOLUENE DIISOCUN-NA UN 2078 DOT Hazar Packaging: [] Bulk [] Drums(Metal) [] Drums(Fib Special Handling Instructions  Expected Quantity 12 [] Annual CERTIFICATION: I hereby certify that all information submitted above an ispected hazards have been disclosed.  Anthorized Signature W.N.Patterson Environmental Affairs Officer	CYANATE  rd Class POISON B  per) [] Other Size 20 gallon  ally [] Quarterly [] Monthly [] Weekly [] One time  and attached is complete and accurate, and that all known of Pattern
DOT Proper Shipping Name WASTE TOLUENE DIISOCUN-NA UN 2078 DOT Hazar Packaging: [] Bulk [] Drums(Metal) [] Drums(Fib Special Handling Instructions  Expected Quantity 12 [] Annual Annual Spected Hazards have been disclosed.  Annual Special Hamilian Signature W.N.Patterson []  Environmental Affairs Officer	CYANATE  rd Class POISON B  er) [] Other Size 20 gallon  ally [] Quarterly [] Monthly [] Weekly [] One time  and attached is complete and accurate, and that all known of Pattern  Date 7/3/87
DOT Proper Shipping Name WASTE TOLUENE DIISOCUN-NA UN 2078 DOT Hazar Packaging: [] Bulk [] Drums(Metal) [] Drums(Fib Special Handling Instructions  Expected Quantity 12 [] Annual CERTIFICATION: I hereby certify that all information submitted above an ispected hazards have been disclosed.  Anthorized Signature W.N.Patterson Environmental Affairs Officer	EYANATE  rd Class POISON B  per) [] Other Size 20 gallon  ally [] Quarterly [] Monthly [] Weekly [] One time  and attached is complete and accurate, and that all known of Pattern

### Olin CREMICALS WASTE INFORMATION FORM

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Date	

GENERAL INFORMATION: Date 7/21/87	Olin Control No. CH-04
Generating Facility CHESHIRE	EPA I.D. No. CTD 980916779/980916779
Address 350 KNOTTER DRIVE/Science Park	Contact W. N. Patterson
Generating Process R&D	Phone (203) 271-4258
Waste Name HYDROGEN SULFIDE	EPA or State Waste Code U135
WASTE CATEGORY: [] Organic & Inorganic (Use most descriptive [] Sulfonated [] Organoph combination) & Acid [] Alkali [] Cy [] Radioactive [] Etiological	hosphate [] Carbamate [] Land Ban Restricted yanide [] Precious Metal Bearing [] Wastewater
PHYSICAL CHARACTERISTICS: Color Colorless Specific Gravity 1.189 Heating Value N/A Physical State Gas (70°C) Ash Content N/A Flashpoint N/A °F [] Qpen Cup [] Closed Cu Layers [x] No layering [] Multi-layered [] Bi-layered	Vapor Pressure N/A Viscosity N/A  p
CHEMICAL COMPOSITION: [] Analysis [2] History []	Estimate METALS: [ ] Total(npm) [ ] FP Fytract/me
HYDROGEN SULFIDE ( - 1007)	Arsenic BNP * Lead BNP
	Barium BNP Mercury BNP
	Cadmium BNP Selenium BNP
()	Chromium BNP . Silver BNP
	OTHER COMPONENTS-TOTAL (ppm)
	Copper BNP Cyanides BNP
	Nickel BNP Sulfides BNP
	ZincBNP Phenolics_BNP
	Thallium BNP PCBs BNP
	TCLP Analysis [] Yes     No [] Attached
	UATADO DATING flambility
HAZARDOUS CHARACTERISTICS:	HAZARD RATING
REACTIVITY: [xk None [] Pyrophoric [] Shock Sens [] Explosive [] Water Reactive [] Ot TOXICITY: [] None [] Irritant [] Low [] Mode	her
DICDOCAT /CUIDDING INCODMATION.	
DISPOSAL/SHIPPING INFORMATION:  Disposal Method	
Disposal Method Treatment	
DOT Proper Shipping Name WASTE HYDROGEN SULFIDE	
UN-NA UN 1053 DOT Hazard	Class FLAMMABLE GAS
Packaging: [] Bulk [] Drums(Metal) [] Drums(Fiber Special Handling Instructions	) [X] Other Lecture Bottle Size 1 lb.
Expected Quantity 1 [] Annual	ly [] Quarterly [] Monthly [] Weekly XK] One time
CERTIFICATION:  I hereby certify that all information submitted above and uspected hazards have been disclosed.  "thorized Signature W.N. Patterson at Least the Environmental Affairs Officer	attached is complete and accurate, and that all known  Date 7/21/87
APPROVALS: Prepared by W.N. Patterson W.N. Patterson	Pose 7/21/87
FAD Disposal Approved by R. S. Hendey 1584 LL	Pate 7/21/87  Date 8/26/97

\*BNP= Believed Not Present

270.14(b)(3) 264.13(b) Waste Analysis Plan

The objective of a good waste analysis plan is to assure successful treatment, storage or disposal of wastes at the facility through recognition and implementation of specific waste analyses procedures selected on waste type, facility type and waste management procedures.

At the Cheshire Research facility, wastes are generated through research projects and stored for shipment off-site. The Cheshire research waste analysis plan screens the many different types of waste for safe handling and storage housed in the waste storage building. See attachment 270.14(b)(3)1

The other area of the waste analysis plan is to address the successful treatment or recovery of wastes when shipped off-site and to observe all regulations that apply to proper disposal of wastes.

In order to assure that wastes are properly stored at the Cheshire facility, both the waste analysis plan and the preparedness and prevention program are designed to emphasize training the chemical personnel to provide the correct information to the Environmental officer for the proper, safe storage of hazardous wastes.

#### GENERAL WASTE ANALYSES PLAN

Waste Analyses will be conducted at the Cheshire Analytical Laboratories or sent off-site to a certified outside laboratory. Analysis procedures for various chemicals follow SW-846 EPA Test Methods latest edition for evaluating solid waste. Waste information forms are completed for every type of waste stored at the Cheshire facility. These forms are compiled from historical information, physical inspection and analytical data. This data is gathered by a Technician and an Environmental Affairs Officer.

The Technician will be mainly engaged in waste collection, segregation, waste packaging and performing sample collections when necessary.

The waste information forms will be reviewed by an analytical chemist and an Environmental Affairs Specialist and the Environmental Affairs Officer before storage, disposal or recovery takes place.

#### GENERAL WASTE IDENTIFICATION PROCEDURES

Every container of waste material will be visually inspected for color and physical state. Any waste which is suspected to be nonconforming can be analyzed following a plan such as the following:

#### LIQUID WASTES - SAMPLING PROCEDURE

Samples will be collected by inserting a glass tube or plastic coliwasa to the bottom of the container so that a representative sample is obtained.

### - Liquid Waste Analysis Procedure For An Unknown Waste Or Known Waste -

Infrared analysis can be performed to confirm the main constituents or identity of the waste. In addition, the following tests can be performed.

1) Flash Point

5) TOC

- 2) pH (corrosivity)
- 6) EP Toxicity
- Presence of Metals
- 7) TCLP
- 4) Halogenated Hydrocarbons
- 8) Reactivity

#### - Method of Disposal -

A method of disposal will be chosen based on the waste information forms data. Certification will be performed on all landfill banned restricted wastes. Notification of land banned wastes will be made to the TSDF.

#### SOLID WASTE - SAMPLING PROCEDURE FOR NEW WASTE

Samples will be collected by using an auger, trier or thief.

## - Analysis Procedure for an Unknown or Known Waste -

Infrared analysis will be performed to confirm the main constituents or identity of the waste. In addition, the following can be performed to provide proper storage or disposal information.

- 1) Corrosivity (ph) 5) TOC 2) Flash Point 6) EP Toxicity
- 3) Presence of Metals 7) TCLP
- 4) Halogenated Hydrocarbons 8) Reactivity 9) Free Liquid

## - Method of Disposal -

A method of disposal will be chosen based on the data presented in waste information form. Certification will be performed on all landfill banned restricted wastes. When disposal takes place, the TSDF will be notified.

### LAB PACKS - SAMPLING PROCEDURE

Laboratory wastes collected in small bottles or containers will be lab packed in fifty-five gallon drums with absorbent material by compatibility Groups A-F (see attachment). No more than fifteen gallons of waste material are packed in a drum. These materials will be sorted to restrict those hazardous wastes that are land ban restricted and certification of such will be made on the waste information form. All lab packs that are land banned will be certified restricted and incinerated. Notification will be sent to TSDF.

## TO DETERMINE PARAMETERS FOR DISPOSAL OF LAB PACKS

Contents of lab packs will be fully identified with a packing slip. Any unknown's will be identified using the above mentioned testing scheme.

#### Compatibility

Because of the many different waste types that can be generated by the Cheshire facility, a variety of tests can be performed to determine if wastes are compatible for the purpose of storage.

The following tests can be performed on materials that are stored at Cheshire.

- 1. reactivity (oxidizer vs. oxidizer)
- 2. reactivity (oxidizer vs. water) or (acid vs. compound)
- 3. explosivity (based on constituents of waste)
- 4. reactivity (organic polymerization vs. water)
  (organic polymerization vs. organic comp.)

It is not possible to have an EPA method for many of these tests. They can be simply performed by mixing the two components together in the lab to determine the result. These tests will tell the environmental officer that he needs to store these compounds with certain precautions.

## QUALITY ASSURANCE PLAN AND POLICIES

A quality assurance plan will enable the company to maintain compliance with the permit conditions of our facility.

The following methods are employed to achieve permit compliance.

- 1. Utilize an outside laboratory to provide information our own laboratory cannot provide.
- 2. Laboratories are required to use EPA approved testing methods.
- 3. Identity of waste and its constituents kept track from the point of generation through use of waste information form until no longer necessary to keep information (minimum three years-five years).
- 4. A completely new and unknown waste will be sampled, except when quantity is small, with a coliwasa or thief and screened for its type of hazard.
- 5. The technician responsible for sampling procedures will be trained in methods for handling hazardous wastes and storage of such wastes and have knowledge of the permit compliance requirements.
- 6. Laboratory waste not properly labeled and identified will be returned to laboratory in which they were generated for proper identification.
- 7. Environmental officer will oversee the overall handling of the wastes and make decisions regarding storing and shipping and disposal. The officer will also be responsible for training of personnel involved with hazardous waste program.
- 8. Any changes in waste characteristics that affect the degree of hazard or type of hazard that the waste is, will be noted in the Waste Information forms and verified by higher authority.
- The environmental officer is also responsible for inspection practices and policies that are required to maintain permit compliance.
- 10. Off-site Olin generated wastes received at New Haven/Cheshire will follow the same procedures that on-site generated wastes follow. This includes using the same waste information form and having it approved by Olin internally before it is shipped to New Haven.
- 11. Environmental affairs officer will screen all Olin shipments to New Haven for acceptance before shipping.

## TEST METHODS THAT CAN BE PERFORMED AND EPA METHOD

All methods used are equivalent to the procedures specified by EPA SW 846 latest edition.

Test Method

Viscosity Brookfield or Ostwald Viscometer

Chlorine Content Potentiometric Titration with Silver

Ash Burning and Gravimetric Method

BTU Parr Bomb Combustion

Flash Point Pensky-Martene or Tag Close Cup 1010

pH pH Meter 9040 or 1110

TOC Method 9060

TCLP Toxicity Characteristic Leaking

Procedure

Liquid Paint Filter Test Method 9095

Toxicity EP Toxicity 1310

Metals Atomic Absorption, ICP, Graphite

Furnace 7040-1 7080-1 7190-1 7420-1 7060-1 7130-1 7210-1 7470-1 7520-1

7950-1

TDI % NCO Internal Olin Procedure

Halogenated Organics Screen IR or Mass Spec

### WASTE HANDLING PROCEDURES FOR LAND BANNED WASTES

The following hazardous wastes have been identified as being land disposal restricted wastes:

- o F001 through F005 spent solvents containing hazardous wastes solids & liquids F020-23 F026-F028 Dioxin containing wastes solids & liquids
- o Liquid hazardous wastes containing metals listed below:

As		500	mg/1
Cd		100	
$\mathtt{Cr}$	V1	500	
Pb		500	
Hg		20	
Ni		134	
Se		100	
T1		130	

o Liquid hazardous wastes containing cyanide equal or greater than 1,000 mg/1.

Liquid hazardous wastes having ph less than or equal to 2.0.

Liquid hazardous wastes PCB's greater than or equal to 50 ppm.

Hazardous wastes containing HOC's total concentration greater than or equal to 1,000 mg/Kg from Appendix III Part 268.

o Soft hammer wastes generated by Olin at New Haven and Cheshire will be evaluated for an acceptable treatment and the Regional Administrator notified.

## Soft-Hammer Wastes

<u>Definition</u>: "Soft-Hammer Wastes" are those materials covered in the "First-Third Landfill Ban" which EPA has not established treatment standards. See 40 CFR Part 261 for description of waste codes.

## List of Soft-Hammer Wastes

	PIPE OF DOLC-Hammer Manco		
F006 (Wastewater)   F007   F008   F009   F019   K004 (Wastewater)   K008 (Wastewater)   K011   K013   K014   K017   K021 (Wastewater)   K022 (Wastewater)   K035   K036 (Wastewater)   K060 (Wastewater)   K061 (Wastewater)   K069 (Calcium sulfate K069 (Wastewater)   K069 (Wastewater)   K069 (Wastewater)   K069 (Wastewater)   F001   F001	when present at concen-	U007 U009 U010 U012 U016 U018 U019 U022 U029 U031 U036 U037 U041 U044 U046 U050 U051 U053 U061 U063 U064 U066 U066 U067 U067 U074 U077 U078 U089 U103 U105 U108 U115	U122 U124 U129 U130 U133 U134 U137 U151 U154 U155 U157 U158 U159 U171 U177 U180 U185 U188 U192 U200 U200 U209 U210 U211 U219 U220 U221 V223 V222 V222 V223 V226 V227 V228 U237 U228 U237 U238 U248(when present at concentrations 0.3% or less) U249(when present at concentrations 10% or less)
. 5100	greater than 10%)		
P123			

## LAND BANNED NOTIFICATION PROCEDURE FOR WASTES

The following procedure should be followed when storing, treating or disposing of a land banned restricted hazardous waste.

Document to accompany manifest for storage, disposal or treatment.

- o Hazardous wastes land banned with treatment standard
- o Send letterhead #1
- Hazardous wastes land banned that meet treatment standards
- o Send letterhead #2
- o Soft hammer hazardous wastes use letterhead #3 to Regional Administrator.

All records to be kept for 5 years.

TCLP test to be completed when demonstrating that waste will meet treatment standard.

# OPTION I YOUR LETTERHEAD

<DATE>

TSDF of Choice, Inc. Costly Street Atown, USA		
	TREATMENT REQUIRED Land Disposal Restrictions	
This is to notify you, pursuant to 40 CFR 268.7(a)(2), that the waste(s) referenced below, shipped on Manifest number are subject to land disposal restrictions specified at 40 CFR Part 268.		
Manifest Line #	EPA Waste #	
the management of this waste applicable standards as set	sposal. Applicable treatment	
Waste analysis data for	these restricted wastes:	
Are also attached		
Are not required ( knowledge of the	this notice is based on my waste)	
It is your responsibility to assure management of these wastes in compliance with all applicable conditions and restrictions imposed by law and regulation.		
	Sincerely,	
)		
Ti	tle:	
I	Date:	

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## OPTION II YOUR LETTERHEAD

DATE

TSDF of Choice, Inc. Costly Street Atown, USA

Gentlemen:

Re: NOTICE OF CONFORMANCE
Land Disposal Restrictions

This is to notify you, pursuant to 40 CFR 268.7(a)(2), that the waste(s) referenced below, shipped on Manifest number \_\_\_\_\_ are subject to land disposal restrictions specified at 40 CFR Part 268.

	Manifest Line #	EPA Waste #	
are:	Applicable treatment standa	ards are attached. Waste analysis dat	:а
***************************************	Also attached		
-	Not required (this noti	ce is based on my knowledge	
in com	mpliance with all applicable and regulation. With regard	are ongoing management of these wastes conditions and requirements imposed to compliance with treatment standard	Ъу
famili knowle compli Subpar RCRA s true, penalt	dar with the waste through a edge of the waste to support ies with the treatment stand of D and all applicable probsection 3004(d). I believe accurate and complete. I a	nat I personally have examined and aminalysis and testing or through this certification that the waste lards specified in 40 CFR Part 268 hibitions set forth in 40 CFR 268.32 of that the information I submitted is an aware that there are significant certification, including the summent.	r
,		Ву:	
		Title:	
		Date:	

Right to reproduce this page is granted Lion Technology Inc. 8/15/87 {This format can be used for demonstrations to your EPA Regional Administrator}

DATE

Regional Administrator USEPA JFK Post Office P.O. Box 8488 Boston, MA 02114

Dear Hohman Director W.M.D.

This letter serves as demonstration and certification required in 40 CFR 268.8(a)1.

{Name of Generator. City. State} generates the following soft-hammer wastes and ships them to {Name of Ultimate Disposal Facility} located in {City. State} for {type of treatment (i.e. incineration. water treatment)}. The "soft-hammer wastes" generated are:

{List of "Soft-Hammer Wastes Potentially Generated}

In search for the acceptable treatment facility for these materials, the following facilities have been contacted with the assistance of our environmental service company:

Name of Facility Address City, State ZIP Telephone Number Contact

Name of Facility Address City, State ZIP Telephone Number Contact

Name of Facility Address City, State ZIP Telephone Number Contact

## LABELING SYSTEM FOR WASTE CHEMICALS (UP TO 5 GALLON SIZE CONTAINERS)

\*\*Chemical name and person placing the waste in the container <u>must</u> appear on the label\*\*

CONTENTS:
NAME/LOC:

- CONTENTS: 1. Inorganic acids, (e.g.: hydrochloric or sulfuric acids).
  - 2. Elements and inorganic salts that <u>do not</u> liberate gaseous products when acidified (e.g.: Sodium chloride, barium sulfate), broken mercury thermometers.

CONTENTS:
NAME/LOC:

- 1. Inorganic alkaline chemicals (e.g.: Sodium hydroxide; ammonium hydroxide).
- Organic bases (e.g.: triethanolamine, pyridine).
- 3. Elements and inorganic salts that liberate gaseous products when acidified (e.g.: potassium cyanide, sodium sulfide).

CONTENTS:
NAME/LOC:

1. Solid organic compounds (excluding organic acids and bases) (e.g.: organic sulfur compounds, sugars, etc.).

CONTENTS:
NAME/LOC:

1. Organic liquids including organic acids but excluding organic bases (e.g.: acetone and toluene).

CONTENTS:
NAME/LOC:

- Inorganic oxidizing agents; (e.g.: potassium nitrate, sodium chlorate).
- 2. HTH and Pace are included in this category, but must be kept separated while awaiting disposal.

CONTENTS:
NAME/LOC:

1. Solid pesticides, insecticides, fungicides, toluene diisocyanate, poison, etc.

NOTE: Shock sensitive materials, pressurized gas cylinders, materials that react with water, radioactive, and materials containing PCB's <u>MUST BE HANDLED SEPARATELY</u>.

Call extension 4258 for pick-up arrangements.

### OLIN RESEARCH - CHESHIRE

## . LABORATORY WASTE DISPOSAL PROCEDURE

## FOR CONTAINERS UP TO 5 GALLON SIZE

## CLASSIFICATION "A-F" SYSTEM

All waste must be classified according to the greatest hazard present, keeping in mind that the material will be packed with other containers of that group.

#### PACKAGING

All waste must be placed in glass, plastic or metal containers which are in good condition with tightly closed lids. (Do Not use the glass gallon jug G-36-I available in the stockroom.) Plastic containers are preferred, providing that the plastic is compatible with the material. All containers should be filled to within one inch of their caps.

## **LABELING**

Each container must be labeled with <u>ONE</u> "A-F" sticker. In addition to the category grouping, the full chemical name or names must appear on the label. Abbreviations, trade names or formulas can not be accepted. Percentages of mixtures <u>must be</u> stated, e.g., (10% Acetone-30% Aceonitrile-60% Toluene), etc. In addition, the name (not initials) of the individual most familiar with the contents is required in case there is a question or problem with the material.

#### COLLECTION

All properly labeled containers will be picked up from the laboratories at least once a week. Special collections resulting from lab clean-up's can be made by calling 4258.

NOTE: Any container without the full chemical name written on the label will not be accepted. All <u>UNKNOWN</u> material must be submitted to the Analytical Department for identification <u>BEFORE</u> it is picked up.

### DRUM PACKING

Approximately 15 gallons of miscellaneous size containers can be packed into a 55 gallon steel drum with absorbent material. All of the containers must be from the same "A-F" group.

As each container is placed in the drum its' contents and size will be recorded on a packing slip. An inventory number is assigned to each drum, as well as the group letter which is painted on the drum for future identification before it is moved to the New Haven storage building.

## **APPROVAL**

When enough packed drums have been accumulated for a truck load, the corresponding packing lists are mailed to the disposal company for their approval. If, upon their review it is found that a waste has been incorrectly packed, that particular drum will not be accepted until the chemical is removed and so certified. (Since this presents an unnecessary hazard to retrieve bottles which may be in the bottom of a drum, it is important that all waste be classified correctly.)

#### REJECTED WASTE

Chemicals which have been rejected in the past include, nitrites, organic peroxides, some isocyanates, acrylates, methacrylates and all water reactives. Tetrahydrofuran, diethyl ether and dioxane will be rejected unless it is mixed with solvents such as acetone, toluene, or water. (The THF must be less than 10% of the mixture.)

HTH and PACE must be labeled as such and be kept away from each other, as well as organic material.

Special handling is required for materials which contain PCB's and asbestos. (Call extension 4258.)

### SHIPPING

Once the packing lists have been approved, a pick up date is scheduled. The drums are stenciled and the appropriate D.O.T. and EPA labels are affixed.

When the disposal company truck arrives, the drums are loaded into the trailer by Olin personnel.

The required paperwork is completed and signed by the driver and the Olin representative. The driver is supplied with copies of the hazardous waste manifest and additional copies of the packing lists which must accompany the drums to the disposal site.

## NOTIFICATION AND RECORD KEEPING

The State of Connecticut is notified of the shipment by mailing them their copy of the manifest. Our copies are kept in a file for a period of three (3) years. The waste log book and computer are updated to reflect the decrease in inventory.

After the drums have been disposed of, the disposal company will return to us and the State of Connecticut the completed signed manifest. This copy must also be retained for a period of at least three (3) years.

If we do not receive the completed signed manifest within 15 days, we are required to notify the State DEP office.

#### WASTE DISPOSAL PROCEDURE

## FOR 5 GALLON OR LARGER SIZE CONTAINERS

All waste materials which will be generated in quantities of 5 gallons or more, must be approved for disposal and assigned a code number <u>PRIOR</u> to pick up. (Arrangements for obtaining 5 and 55 gallon drums can be made by calling extension 4258.)

Prepared by W. N. Patterson Environmental Affairs Officer 8/5/86

## DISPOSAL PROCEDURE FOR EMPTY CONTAINERS

## WHICH ONCE HELD HAZARDOUS MATERIAL

## EPA DEFINITIONS OF EMPTY

- 1. Containers that have held hazardous materials other than gases and those listed by EPA as "acutely hazardous materials", are considered empty when all the material is removed using the practices commonly used to remove material, e.g. pouring, pumping, etc. and not more than one inch of solids or 3 percent by weight of the total capacity of the container is left in the bottom.
- 2. Containers of compressed gas are considered empty when they have been opened to atmospheric pressure.
- 3. Any containers that have held "acutely hazardous materials" are considered empty after being triple rinsed with an appropriate solvent, or when their inner liner has been removed.

NOTE: The solvent used for the rinse is considered a hazardous waste and must be handled as such.

Any containers meeting the definition of "EMPTY" may be discarded as ordinary trash.

Those chemicals which are listed as "acutely hazardous" by EPA are set forth in Title 40 CFR, Part 261.33(e). A copy of this list is included in the Olin Safety Manual, Pages R-16 and R-17.

Prepared by W. N. Patterson Environmental Affairs Officer 8/6/86

## 40 CFR PART 261.33 (e)

## COMMERCIAL CHEMICAL PRODUCTS IDENTIFIED AS ACUTE HAZARDOUS WASTES

## "E LIST"

Hazardous Waste No. Substance P 002		
Acetaidehyde, Chloro- P 002 Acetamide, N-(aminothixomethyl)- P 057 Acetamide, N-(aminothixomethyl)- P 058 Acetic acid, fluoro-, sodium salt P 066 Acetimidic acid, N-((methylcar-bamoyl)oxy)thio-, methyl ester 3 - (altha-acetonyhenzyl)-4-hydroxycoumarin and salts P 002 l-Acetyl-2-thiourea P 003 Acrolein P 070 Aldicarb P 004 Aldrin P 005 Allyl alcohol P 006 Aluminum phosphide P 007 S-(Aminomethyl)-3-isoxazolol P 008 4-Aminopyridine P 009 Ammonium vanadate P 010 Arsenic acid P 011 Arsenic (III) oxide P 011 Arsenic (IV) oxide P 011 Arsenic (IV) oxide P 012 Arsenic trioxide P 013 Barium cyanide P 014 Benzenamine, 4-chloro- P 077 Benzenamine, 4-ritro- P 028 Benzene, (chloromethyl)- P 042 1,2-Benzenediol, 4-(l-hydroxy-2-(methyl-amino)ethyl)- P 043 Benzenthiol P 014 Benzenethiol P 015 Beryllium dust P 016 Bis(chloromethyl) ether P 017 Bromosacetone P 018 Brucine P 021 Calcium cyanide P 022 Carbon disulfide P 023 Chlorinecyanide P 024 Carbon bisulfide P 025 Carbonyl chloride P 026 Carbonyl chloride P 027 Goper cyanide P 028 Carbonyl chloride P 029 Carbon of control cacid P 020 Carbon of cacid control cacid P 021 Calcium cyanide P 022 Carbon disulfide P 023 Chlorinecyanide P 024 Carbonyl chloride P 025 Carbonyl chloride P 026 Carbonyl chloride P 027 Goper cyanides P 028 Copper cyanides P 029 Copper cyanides P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanides (soluble cyanide salts), not else-where specified	Hazardous	
P 002 Acetamide, N-(aminothioxomethyl)- P 057 Acetamide, 2-fluoro- P 058 Acetic acid, fluoro-, sodium salt P 066 Acetimidic acid, N-((methylcar-bamoyl)oxy)thio-, methyl ester P 001 3-(altha-acetonyibenzyl)-4-hydroxycoumarin and salts P 002 1-Acetyl-2-thiourea P 003 Acrolein P 070 Aldicarb P 004 Aldrin P 005 Allyl alcohol P 006 Aluminum phosphide P 007 5-(Aminomethyl)-3-isoxazolol P 008 4-Aminopyridine P 009 Ammonium picrate (R) P 119 Ammonium picrate (R) P 119 Arsenic acid P 011 Arsenic (II) oxide P 011 Arsenic (IV) oxide P 011 Arsenic (V) oxide P 011 Arsenic trioxide P 012 Arsenic trioxide P 013 Barium cyanide P 013 Barium cyanide P 014 Benzenamine, 4-chloro- P 077 Benzenamine, 4-nitro- P 028 Benzene, (chloromethyl)- P 042 1,2-Benzenediol, 4-(1-hydroxy-2-(methyl-amino)ethyl)- P 043 Benzenthiol P 015 Beryllium dust P 016 Bis(chloromethyl) ether P 017 Bromoacetone P 018 Brucine P 021 Calcium cyanide P 022 Carbon disulfide P 022 Carbon disulfide P 023 Chlorinecyanide P 024 Carbonyl chloride P 025 Carbonyl chloride P 026 Carbonyl chloride P 027 Ghoroactaldehyde P 028 Carbonyl chloride P 029 Copper cyanides P 020 Copper cyanides P 021 Copper cyanides P 022 Copper cyanides P 023 Cyanides (soluble cyanide salts), not else-where specified P 029 Cyanides P 030 Cyanides (cyanide salts), not else-where specified	Waste No.	Substance
P 002 Acetamide, N-(aminothioxomethyl)- P 057 Acetamide, 2-fluoro- P 058 Acetic acid, fluoro-, sodium salt P 066 Acetimidic acid, N-((methylcar-bamoyl)oxy)thio-, methyl ester 3-(altha-acetonybenzyl)-4-hydroxycoumarin and salts P 002 1-Acetyl-2-thiourea P 003 Acrolein P 070 Aldicarb P 004 Aldrin P 005 Allyl alcohol P 006 Aluminum phosphide P 007 S-(Aminomethyl)-3-isoxazolol P 008 4-Aminopyridine P 009 Ammonium picrate (R) P 119 Ammonium picrate (R) P 119 Ammonium vanadate P 010 Arsenic acid P 011 Arsenic (II) oxide P 011 Arsenic (IV) oxide P 011 Arsenic (IV) oxide P 012 Arsenic trioxide P 013 Barium cyanide P 013 Barium cyanide P 014 Benzenamine, 4-chloro- P 077 Benzenamine, 4-nitro- P 028 Benzene, (chloromethyl)- P 042 1,2-Benzenediol, 4-(1-hydroxy-2-(methyl-amino)ethyl)- P 043 Benzenethiol P 026 Benzenethiol P 027 Calcium cyanide P 028 Benzenethiol P 029 Carbon disulfide P 020 Carbon disulfide P 021 Calcium cyanide P 022 Carbon disulfide P 023 Chloropochapilythiourea P 024 Copper cyanides P 025 Copper cyanides P 026 Copper cyanides P 027 Copper cyanides P 028 Copper cyanides P 029 Copper cyanides P 020 Copper cyanides P 021 Copper cyanides P 022 Copper cyanides P 023 Cyanides (soluble cyanide salts), not else-where specified P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified	P 023	Acetaldehyde Chloro-
P 057 P 058 Acetic acid, fluoro-, sodium salt P 066 Acetimidic acid, N-((methylcar-bamoyl)oxy)thio-, methyl ester P 001 P 001 P 002 P 002 P 003 Acrolein P 070 Aldicarb P 004 Aldrin P 005 Allyl alcohol P 006 Aluminum phosphide P 007 P 070 Ammonium picrate (R) P 119 Ammonium vanadate P 010 Arsenic acid P 012 Arsenic (III) oxide P 011 Arsenic (V) oxide P 012 Arsenic trioxide P 013 Arsine, diethyl- P 054 Azindine P 015 Barium cyanide P 016 Barium cyanide P 017 Benzenamine, 4-chloro- P 078 P 088 Benzene, (chloromethyl)- P 042 P 042 P 054 Benzenediol, 4-(1-hydroxy-2-(methyl-amino)ethyl)- P 054 Benzenethiol P 015 Benzelinide P 016 Benzenethiol P 017 Benzenamine, dethyl P 018 Benzenethiol P 019 Benzenethiol P 010 Benzenene, octachloro- P 017 Boromoacetone P 018 Brucine P 021 Calcium cyanide P 022 Carbon bisulfide P 023 Carbon bisulfide P 024 Carbon disulfide P 025 Carbonyl chloride P 026 P 027 Carbonophrophyl) thiourea P 027 P 028 P 029 Copper cyanides P 020 Copper cyanides P 021 Copper cyanides P 022 Copper cyanides P 023 Copper cyanides P 024 Copper cyanides P 025 Copper cyanides P 026 Copper cyanides P 027 Copper cyanides P 028 Copper cyanides P 029 Copper cyanides P 021 Copper cyanides P 023 Copper cyanides P 024 Copper cyanides P 025 Copper cyanides P 026 Copper cyanides P 027 Copper cyanides P 028 Copper cyanides P 039 Cyanides (Soluble cyanide salts), not else-where specified P 030 Cyanides (Soluble cyanide salts), not else-where specified P 031 Cyanides P 032 Cyanides P 033 Cyanides P 033 Cyanides P 033 Cyanides P 034 Cyanides P 035 Cyanides P 036 Cyanides P 037 Cyanides P 037 Cyanides P 038 Cyanides P 030 Cyanides P 031 Cyanides P 032 Cyanides P 032 Cyanides P 033 Cyanides P 034 Cyanides P 035 Cyanides P 036 Cyanides P 036 Cyanide		
P 058 Acetic acid, fluoro-, sodium salt P 066 Acetimidic acid, N-((methylcar-bamoyl)oxy)thio-, methyl ester P 001 3-(altha-acetonyibenzyl)-4-hydroxycoumarin and salts P 002 1-Acetyl-2-thiourea P 003 Acrolein P 070 Aldicarb P 004 Aldrin P 005 Allyl alcohol P 006 Aluminum phosphide P 007 5-(Aminomethyl)-3-isoxazolol P 008 4-Aminopyridine P 009 Ammonium picrate (R) P 119 Ammonium vanadate P 010 Arsenic acid P 011 Arsenic (III) oxide P 011 Arsenic pentoxide P 011 Arsenic trioxide P 012 Arsenic trioxide P 013 Arsine, diethyl- P 054 Azindine P 015 Benzenamine, 4-chloro- P 077 Benzenamine, 4-chloro- P 077 Benzenamine, 4-chloro- P 077 Benzenamine, 4-chloro- P 078 Benzenethiol P 042 1,2-Benzenediol, 4-(1-hydroxy-2-(methyl-amino)ethyl)- P 043 Benzyl chloride P 015 Beryllium dust P 016 Bis(chloromethyl) ether P 017 Bromoacetone P 018 Brucine P 019 Calcium cyanide P 021 Calcium cyanide P 022 Carbon disulfide P 022 Carbon disulfide P 023 Chloroacetaldehyde P 024 p-Chloroaniline P 025 Carbonyl chloride P 026 1-(o-Chlorohenyl) thiourea P 027 Copper cyanides P 028 Copper cyanides P 029 Copper cyanides P 029 Cyanides (soluble cyanide salts), not else-where specified P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogem		the contract of the contract o
P 066 Acetimidic acid, N-(methylcar-bamoyl)oxy)thio-, methyl ester P 001 3-(altha-acetonyibenzyl)-4-hydroxycoumarin and salts P 002 1-Acetyl-2-thiourea P 003 Acrolein P 004 Aldrin P 005 Allyl alcohol P 006 P 007 S-(Aminomethyl)-3-isoxazolol P 008 A-manionyridine P 009 Ammonium picrate (R) P 119 Ammonium vanadate P 010 Arsenic acid P 011 Arsenic (III) oxide P 011 Arsenic pentoxide P 012 Arsenic pentoxide P 013 Arsenic pentoxide P 013 Barium cyanide P 014 P 015 Benzenamine, 4-chloro- P 077 Benzenamine, 4-chloro- P 077 Benzenemine, 4-chloro- P 078 P 028 Benzene, (chloromethyl)- P 042 1,2-Benzenediol, 4-(1-hydroxy-2-(methyl-amino)ethyl)- P 043 Benzenthol P 014 Benzenethol P 015 Beryllium dust P 016 Bis(chloromethyl) ether P 017 Bromoacetone P 018 Brucine P 021 Calcium cyanide P 022 Carbon bisulfide P 022 Carbon bisulfide P 023 Carbonyl chloride P 033 Chlorine cyanide P 024 P-Chloroacetaldehyde P 024 P-Chloroacetaldehyde P 025 Copper cyanides P 026 Copper cyanides P 027 Copper cyanides P 028 Copper cyanides P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanides (Soluble cyanide salts), not else-where specified		· · · · · · · · · · · · · · · · · · ·
P 001		
P 002		
P 003 Acrolein P 070 Aldicarb P 004 Aldrin P 005 Allyl alcohol P 006 Aluminum phosphide P 007 5-(Aminomethyl)-3-isoxazolol P 008 4-Aminopyridine P 009 Ammonium picrate (R) P 119 Ammonium vanadate P 010 Arsenic acid P 012 Arsenic (III) oxide P 011 Arsenic (V) oxide P 011 Arsenic trioxide P 012 Arsenic trioxide P 013 Arsine, diethyl- P 054 Azindine P 014 Barium cyanide P 024 Benzenamine, 4-chloro- P 077 Benzenamine, 4-nitro- P 078 Benzene, (chloromethyl)- P 042 1,2-Benzenediol, 4-(1-hydroxy-2-(methyl-amino)ethyl)- P 014 Benzenethiol P 015 Beryllium dust P 016 Bis(chloromethyl) ether P 017 Bromoacetone P 018 Brucine P 021 Calcium cyanide P 022 Carbon disulfide P 023 Chloroactilde P 033 Chlorinecyanide P 024 Carbon disulfide P 025 Carbonyl chloride P 026 Carbonyl chloride P 037 Chloroactaldehyde P 024 D-Chloroaniline P 025 Copper cyanides P 026 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen		
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P 017 Bromoacetone P 018 Brucine P 021 Calcium cyanide P 123 Camphene, octachloro- P 103 Carbaminidoseienoic acid P 022 Carbon bisulfide P 022 Carbon disulfide P 095 Carbonyl chloride P 033 Chlorine cyanide P 023 Chloroacetaldehyde P 024 p-Chloroaniline P 026 1-(o-Chlorophenyl)thiourea P 027 3-Chloropropionitrile P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen	P 015	Beryllium dust
P 018 Brucine P 021 Calcium cyanide P 123 Camphene, octachloro- P 103 Carbaminidoseienoic acid P 022 Carbon bisulfide P 022 Carbon disulfide P 095 Carbonyl chloride P 033 Chlorine cyanide P 024 p-Chloroaniline P 024 p-Chloroaniline P 026 1-(o-Chlorophenyl)thiourea P 027 3-Chloropropionitrile P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen	P 016	Bis(chloromethyl) ether
P 021 Calcium cyanide P 123 Camphene, octachloro- P 103 Carbaminidoseienoic acid P 022 Carbon bisulfide P 022 Carbon disulfide P 095 Carbonyl chloride P 033 Chlorine cyanide P 023 Chloroacetaldehyde P 024 p-Chloroaniline P 026 1-(o-Chlorophenyl) thiourea P 027 3-Chloropropionitrile P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen	P 017	Bromoacetone
P 123 Camphene, octachloro- P 103 Carbaminidoseienoic acid P 022 Carbon bisulfide P 022 Carbon disulfide P 095 Carbonyl chloride P 033 Chlorine cyanide P 023 Chloroacetaldehyde P 024 p-Chloroaniline P 026 1-(o-Chlorophenyl)thiourea P 027 3-Chloropropionitrile P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen	P 018	Brucine
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P 022 Carbon disulfide P 095 Carbonyl chloride P 033 Chlorine cyanide P 023 Chloroacetaldehyde P 024 p-Chloroaniline P 026 l-(o-Chlorophenyl) thiourea P 027 3-Chloropropionitrile P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen	P 103	Carbaminidoseienoic acid
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P 033 Chlorine cyanide P 023 Chloroacetaldehyde P 024 p-Chloroaniline P 026 1-(o-Chlorophenyl) thiourea P 027 3-Chloropropionitrile P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen		
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P 026 1-(o-Chlorophenyl)thiourea P 027 3-Chloropropionitrile P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen		· · · · · · · · · · · · · · · · · · ·
P 027 3-Chloropropionitrile P 029 Copper cyanides P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen		
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P 030 Cyanides (soluble cyanide salts), not else-where specified P 031 Cyanogen		- · · · · · · · · · · · · · · · · · · ·
P 031 Cyanogen		
•		Cyanides (soluble cyanide salts), not else-where specified
P 033 Cyanogen chloride - 6-		
	P 033	Cyanogen chloride - 6-

## "E LIST" (Continued)

Hazardous	
Waste No.	Substance
P 036	Dichlorophenylarsine
P 037	Dieldrin
P 038	Diethylarsine
P 039	0,0-Diethyl S-(2-(ethylthio)ethyl) phos-phorodithioate
P 041	Diethyl-p-nitrophenyl phosphate
P 040	0,0-Diethyl 0-pyrazinyl phosphorothioate
P 043	Diisopropyl fluorophosphate
P 044	Dimethoate
P 045	3,3-Dimethyl-1-(methylthio)-2-butanone, 0-((methylamino)carbonyl) oxime
P 071	0,0-Dimethyl 0-p-nitrophenyl phosphoro-thioate
P 082	Dimethylnitrosamine
P 046	alpha, alpha-Dimethylphenethylamine
P 047	4,6-Dinitro-o-cresol and salts
P 034	4,6-Dinitro-o-cyclohexylphenol
P 048	2,4-Dinitrophenol
P 020	Dinoseb
P 085	Diphosphoramide, octamethyl-
P 039	Disulfoton
P 049	2.4-Dithiobiuret
P 109	·
	Dithiopyrophosphoric acid, tetraethyl ester Endosulfan
P 050	
P 088	Endothal
P 051	Endrin
P 042	Epinephrine
P 046	Ethanamine, 1,1-dimethy1-2-phenyl-
P 084	Ethenamine, N-methyl-N-nitroso-
P 101	Ethyl cyanide
P 054	Ethyleneimine '
P 097	ramphor
P 056	Fluorine
P 057	Fluoroacetamide
P 058	Fluoroacetic acid, sodium salt
P 065	Fulminic acid, mercury(II) salt (R,T)
P 059	Heptachlor
P 051	1,2,3,4,10,10-Hexachloro-6,7-eopxy-1,4,4a,5,6,7,8,8a-octahydro-endo,endo-
	1,4:5,8-dimethanonaphthalene
P 037	1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,exo-
D 060	1,4:5,8-demethanonaphthalene
P 060	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo, endo-dimeth-
T 00/	anonaphthalene
P 004	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexathydro-1,4:5,8-endo,exo-
	dimethanonaphthalene
P 060	Hexachlorohexahydro-exo, exo-dimethanonaphthalene
P 062	Hexaethyl tetraphosphate
P 116	Hydrazinecarbothioamide
P 068	Hydrazine, methyl-
P 063	Hydrocyanic acid
P 063	Hydrogen cyanide
P 096	Hydrogen phosphide
P 064	Isocyanic acid, methyl ester
P 007	3(2H)-Isoxazolone, 5-(aminomethy1)-

## "E LIST" (Continued)

	Hazardous	
	Waste No.	Substance
i	P 092	Mercury, (acetato-0)phenyl-
	P 065	Mercury fulminate (R,T)
	P 016	Methane, oxybis(chloro-
	P 112	Methane, tetranitro- (R)
	P 118	Methanethiol, trichloro-
	P 059	4,7-Methano-1H-indene, 1,4,5,6,8,8-hep-tachloro-3a,4,7,7a-tetrahydro-
	P 066	Methomyl
	P 067	2-Methylaziridine
	P 068	Methyl hydrazine
	P 064	Methyl isocyanate
	P 069	2-Methyllactonitrile
	P 071	Methyl parathion
	P 072	alpha-Naphthylthiourea
	P 073	Nickel carbonyl
	P 074	Nickel cyanide
	P 074	Nickel(II)cyanide
	P 073	Nickel tetracarbonyl
	P 075	Nicotine and salts
	P 076	Nitric oxide
	P 077	p-Nitroaniline
	P 078	Nitrogen dioxide
	P 076	Nitrogen(II) oxide
	P 078	Nitrogen(IV) oxide
	P 081	Nitroglycerine (R)
ì	P 082	N-Nitrosodimethylamine
	P 084	N-Nitrosomethylvinylamine
	P 050	5-Norbornene-2,3-dimethanol, 1,4,5,6,7,7-hexachloro, cyclic sulfite
	P 085	Octamethylpyrophosphoramide
	P 087	Osmium oxide
	P 087	Osmium tetroxide
	P 038	7-0xabicyclo(2.2.1)heptane-2,3-dicarboxylic acid
	P 089	Parathion
	P 034	Phenol, 2-cyclohexyl-4,6-dinitro-
	P 048	Phenol, 2,4-dinitro-
	P 047	Phenol, 2,4-dinitro-6-methyl-
	P 020	Phenol, 2, 4-dinitro-6-(1-methylpropyl)-
	P 009	Phenol, 2,4,6-trinitro-, ammonium salt (R)
	P 036	Phenyl dichloroarsine
	P 092	Phenylmercuric acetate
	P 093	N-Phenylthiourea
	P 094	Phorate
	P 095	Phosgene
	P 096	Phosphine
	P 041	Phosphoric acid, diethyl p-nitrophenyl ester
	P 044	Phosphorodithioic acid, 0,0-dimethyl S-(2-(methylamino)-2-oxoethyl)ester
	P 043	Phosphorofluoric acid, bis(1-methylethyl)-ester
	P 094	Phosphorothioic acid, 0,0-diethyl S-(ethylthio)methyl ester
	P 089	Phosphorothioci acid, 0,0-diethyl 0-(p-nitrophenyl)ester
1	P 040	Phosphorothioc acid, 0,0-diethyl 0- pyrazinyl ester
÷	P 097	Phosphorothioic acid, 0,0-dimethyl 0- (p-((dimethylamino)-sulfonyl)phenyl)
	P 110	Plumbana, tetraethyl-
	P 098	Potassium cyanide
	P 099	Potassium silver cyanide
	P 070	Propanal, 2-methyl-2-(methylthio) 0-((methylamino)carbonyl)oxime

## "E LIST" (Continued)

Hazardous	
Waste No.	Substance
P 101	Propanenitrile
P 027	Propanenitrile, 3-chloro-
P 069	Propanenitrile, 2-hydroxy-2-methyl-
P 081	1,2,3-Propanethiol, trinitrate- (R)
P 017	2-Propanone, 1-bromo-
P 102	Propargyl alcohol
P 003	2-Propenal
P 005	2-Propen-1-ol
P 067	1,2-Propylenimine
P 102	2-Propyn1-ol
P 008	4-Pyridinamine
P 075	Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts
P 111	Pyrophosphoric acid, tetraethyl ester
P 103	Selenourea
P 104	Silver cyanide
P 105	Sodium azide
P 106	Sodium cyanide
P 107	Strontium sulfide
P 106	Strychnidin-10-one, and salts
P 108	Strychnidin-10-one,2,3-dimethoxy-
P 108	Strychnine and salts
P 115	Sulfuric acid, thallium(I)salt
P 109	Tetraethyldithiopyrophosphate
P 110	Tetraethyl lead
P 111	Tetraethylpyrophosphate
P 112	Tetranitromethane (R)
P 062	Tetraphosphoric acid, hexaethyl ester
P 113	Thallic oxide
P 113	Thallium(III)oxide
.P 114	Thallium(I)selenite
P 115	Thallium(I)sulfate
P 045	Thiolanox
P 049	Thiomidodcarbonic diamide
P 014	Thiophenol
P 116	Thiosemicarbazide
P 026	Thiourea, (2-chlorophenyl)-
P 072	Thiourea, 1-naphthalenyl-
P 093	Thiourea, phenyl-
P 123	Toxaphene Trichloromethanethiol
P 118	
P 119	Vanadic acid, ammonium salt
P 120 P 120	Vanadium pentoxide Vanadium (V) oxide
P 001	Wartanin
P 121	Zinc cyanide
.P 122	Zinc phosphide (R,T)
. F 1.4.4	aric bioshirae (vir)

<sup>\*</sup>ALL CONTAINERS WHICH PREVIOUSLY HELD ANY OF THE ABOVE LISTED CHEMICALS MUST BE DISPOSED OF AS A HAZARDOUS WASTE, UNLESS THEY HAVE BEEN TRIPLE RINSED.

<sup>\*</sup>The above applies to containers over five gallons capacity ONLY.



CONTRACT S	ERVICES U	SE ONLY
Exhibit #	Page	of
Contract # C	-	
Date		
Contractor		
Waste Code		

WASIE INF	URMATION FORM Contractor Waste Code
GENERAL INFORMATION: Date Generating Facility	Olin Control No.
Address	Contact
Generating Process	Phone
Waste Name EPA or State Waste Code	
	*********************************
combination) [] Acid [] Alkali [] ( [] Radioactive [] Etiologica	ic [] Pesticide [] Halogenated phosphate [] Carbamate [] Land Ban Restricted Cyanide [] Precious Metal Bearing [] Wastewater I [] Solvent
PHYSICAL CHARACTERISTICS: Color	Odor Free Liquid % pH
Specific Gravity Heating Value	Vapor Pressure Viscosity , cks
PHYSICAL CHARACTERISTICS: Color Specific Gravity Heating Value Physical State (70°F) Ash Content	Organically Bound Chlorine
Flashpoint F[] Open Cup [] Closed C Layers: [] No layering [] Multi-layered [] Bi-layere	Cup Cup
Layers: [] No layering [] Multi-layered [] Bi-layere	d Comments:
CHEMICAL COMPOSITION: [] Analysis [] History [	[] Estimate METALS: [] Total(ppm) [] EP Extract(mg/
<u> </u>	Arsenic Lead
	Barium Mercury Cadmium Selenium
	Chromium Silver
	OTHER COMPONENTS-TOTAL (ppm)  Connect Components
	CopperCyanides
<u> </u>	Nickel Sulfides
· · · · · · · · · · · · · · · · · · ·	Zinc Phenolics PCBs
	TCLP Analysis [] Yes [] No [] Attached
	EXTERES ENDING [ ] Tes [ ] TO [ ] Attached
HAZARDOUS CHARACTERISTICS:	HAZARD RATING
REACTIVITY: [] None [] Pyrophoric [] Shock Ser	nsitive
[] Explosive [] Water Reactive [] (	Other Health X Reactivit
TOXICITY: [] None [] Irritant [] Low [] Mo	oderate [] High Special Instructions
DISPOSAL/SHIPPING INFORMATION: Disposal Method	
Dapour Monot	
DOT Proper Shipping Name_	
DOT Hazard Class UN-NA	
Packaging: [] Bulk [] Drums(Metal) [] Drums(Fit Special Handling Instructions	oer) [] Other Size
	ally [] Quarterly [] Monthly [] Weekly [] One time
	nd attached is complete and accurate, and that all known of
suspected hazards have been disclosed.	
Authorized Signature	Date
APPROVALS:	
EAD Disposal Approved by	Date Date
[] Additional Information Attached [] On Back BNP - Believed Not Present NA - Not Applica	
Form CSD-WOI Revised 8/87	-ATA



## WASTE INFORMATION FORM

Exhibit #	ERVICES USE ONLY Page of
Contract . CS	
Date	
Contractor	
Waste Code	

ENERAL INFORMATION: Date	Olin Control No. EPA I.D. No. Contact Phone
WASTE CATEGORY: [] Organic [] Inorganic (Use most descriptive [] Sulfonated [] Organopl combination) [] Acid [] Alkali [] Cy	vanide [] Precious Metal Bearing [] Wastewater  1 [] Solvent [] Dioxin [] First Third Restricted
PHYSICAL CHARACTERISTICS: Color Specific Gravity Heating Value Physical State (70°F) Ash Content Flashpoint °F [] Open Cup [] Closed Cu Layers: [] No layering [] Multi-layered [] Bi-layered	Odor Free Liquid % pH
	Arsenic Lead Barium Mercury Cadmium Selenium Chromium(Hex) Silver OTHER COMPONENTS-TOTAL (ppm) Copper Cyanides Nickel Sulfides Zinc Phenolics Thallium PCBs
HAZARDOUS CHARACTERISTICS:  REACTIVITY: [] None [] Pyrophoric [] Shock Sens [] Explosive [] Water Reactive [] Ot TOXICITY: [] None [] Irritant [] Low [] Model of the control of the contr	ther Mealth X Reactivity
DISPOSAL/SHIPPING INFORMATION: Disposal Method	**************************************
DOT Proper Shipping Name  DOT Hazard Class UN-NA  Packaging: [] Bulk [] Drums(Metal) [] Drums(Fiber Special Handling Instructions	RQ r) [] OtherSize
	ly [] Quarterly [] Monthly [] Weekly [] One time
CERTIFICATION: I hereby certify that all information submitted above and suspected hazards have been disclosed. Authorized Signature	
Title	Date
PROVALS:  _AD Disposal Approved by  [] Additional Information Attached  BNP - Believed Not Present Form CSD-WO1 Revised 9/88 _	Date [ ] MSDS Attached

## FORM CSD-W01

## INSTRUCTIONS FOR COMPLETING

- 1. Control No. Unique identifying number assigned by plant for this waste.
- 2. <u>90-day Disposal Requirement</u> Used only for plants without permitted storage facilities where regulations require shipment within 90 days.
- 3. Generating Facility Plant or other location which generated the waste.
- 4. EPA I. D. No. I.D. of plant or location as assigned by EPA, e.g., TN 003337929.
- 5. Address Street and city of plant or location.
- 6. <u>Contact</u> Name of plant person who disposer should call if there are questions regarding this waste.
- 7. Generating Area Area or process in plant that generates waste, e.g., chlorine plant, wastewater treatment area, etc.
- 8. Phone Telephone number of contact.
- 9. <u>Waste Name</u> Descriptive name of waste. May be a common name. E.g., TDI residue, filter sludge, etc.
- 1u. <u>EPA Waste Code</u> List all applicable codes from 40 CFR 261. E.g., D006, F005, K027, etc. "None" for non-hazardous wastes.
- 11. <u>DOT Shipping Name</u> Proper DOT Shipping name from 49 CFR 172. Most specific name describing waste should be used.
- 12. UN/NA DOT hazardous material code from 49 CFR 172.
- 13. <u>DOT Hazard Class</u> Classification of waste from 49 CFR 172. Where more than one class is applicable, 49 CFR 173.2 gives the priority order of the classes.
- 14. Packaging Check type to be used to ship waste offsite. If two types of packaging can be used, mark both and comment in remarks section, e.g., "Shipment to Incinerator may be in drums or vacuum truck." If other, describe, e.g., 350 gal. cylinder.
- 15. <u>Special Handling Instructions</u> Any shipping, handling, packaging requirements to handle the waste safely should be outlined here.
- 16. Expected Quantity/Units Estimated quantity of waste by weight or volume and number of containers, e.g., 30,000 lbs. (60 drums). Units should relate to units as packed for disposal, i.e., drums should be drums not pounds.
- 7. Waste Category All applicable blocks should be checked. Purpose is to describe waste generally so disposer can clearly recognize what type of material he has.

## Form CSD-W01 Instructions for Completing Page 2

- 18. Color and Odor Distinctive characteristics to allow quick check on agreement between manifest description and waste received.
- 19. Physical State @ 25°C Check appropriate block.
- 20. Composition based on The source of the detailed analysis. Should be in accordance with facility waste analysis plan.

Analysis - means a representative sample of waste was analyzed specifically to fill out this form.

History - means this waste is one for which analytical data has been established in the past and the waste is expected to be similar in all major aspects.

Best estimate - means that the composition is based upon the preparer's knowledge of the waste and its likely composition.

- 21. Composition All known constituents of the waste should be listed in order of content. Ranges used to describe a constituent in a waste should be wide enought to cover expected variations in composition and narror enough to provide a meaningful description of the constituents present. Should total to 100% or an explanation provided. Guidelines are:
  - a. For a waste with free liquids, the % solids by volume should be a constituent.
  - b. % dissolved solids should be included for aqueous wastes.
  - c. For wastes to be incinerated, heavy metals and corrosives should be included. Some states have specific requirements, e.g., Texas requires mercury and lead content. At a minimum the following should be considered for wastes to be incinerated.
    - 1. Sulfur
    - 2. Chlorine (or other halogen)
    - 3. Mercury
    - 4. Arsenic
    - 5. Lead
- 22. pH For aqueous wastes only.
- 23. Specific weight Generally lbs/gal for liquids or lbs/ft3 for solids.
- 24. Flashpoint Closed cup only (Pensky-Martens or Setaflash or equivalent).
- 25. Vapor Pressure Use 25℃ data or specify temperature.
- 26. Heating Value BTU/1b.
- 27. Ash Content Non-incinerable residue in weight % or ppmw.

tructions for Completing ge 3

- 28. Toxicity Rating based on terminology and system described in Sax' "Dangerous Properties of Industrial Materials." Toxicity of waste mixture is desired, but published data on major constituents may be used with an appropriate comment. In many cases, toxicity will be based on judgement and experience with handling waste. Consult Environmental Specialist if assistance is needed.
- 29. <u>Hazard Rating</u> Rating based on terminology and system published by the National Fire Protection Association (NFPA). See attached pages.
- 30. Method of Disposal Generally used to indicate type of disposal, e.g., secure landfill, incineration, neutralization, etc. For particular wastes, may be used to designate the only technically acceptable facilities; technical reasons must be separately outlined in single source memo. This should be used with discretion since lowest pricing usually results from competitive bidding.
- 31. Prepared by and Approved by Generally the Plant Environmental Coordinator and the Plant Environmental Manager. Signatures may be same person in small plants.
- EAD Disposal Approved by Generally EAD Environmental Regional Manager or Specialist. Approval is for Method of Disposal (or specific site) for this waste.

## TABLE

## EXPLANATION OF NFPA HAZARD CLASSIFICATIONS

Classification		1	Materials that must be preheated before ignition can occur.
Health Hazard (blue)	<u>Definition</u>	0	Materials that will not burn.
4	Materials which on very short exposure could cause death or major residual injury even though prompt medical treat-	Reactivity (yellow)	
	ment were given.	4	Materials which in themselves are readily capable of detonation or of explosive decomposition or reaction at
3	Materials which on short exposure could cause serious temporary or residual injury even though prompt medical		normal temperatures and pressures.
•	treatment were given.	3	Materials which in themselves are capable of detonation or explosive reaction but require a strong initiating source or
2	Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.		which must be heated under confinement before initiation or which react explosively with water.
1 1 T	Materials which on exposure would cause irritation but only minor residual injury even if no treatment is given.	2	Materials which in themselves are normally unstable and readily undergo violent chemical change but do not detonate. Also materials which may react violently with
0	Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustible mate-	٠٠.	water or which may form potentially explosive mixtures with water.
Flammability (red)	rial.	1	Materials which in themselves are normally stable, but which can become unstable at elevated temperatures and pressures or which may react with water with some release
4	Materials which will rapidly or completely vaporize at		of energy but not violently.
	atmospheric pressure and normal ambient temperature, or which are readily dispersed in air and which will burn readily.	0	Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.
3	Liquids and solids that can be ignited under almost all ambient temperature conditions.	Other (white)	
2	Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.	-₩-	Materials which react so violently with water that a possible hazard results when they come in contact with water, as in a fire situation. Similar to Reactivity Classification 2.
		Оху	Oxidizing material; any solid or liquid that readily yields oxygen or other oxidizing gas, or that readily reacts to oxidize combustible materials.

## 270.14(b)(4) Security

Please find attachment 270.14(b)(4)1 as a written procedure that follows CFR 40 264.14 and includes:

- o 24 hour surveillance system
- o a means to control entrance into the facility
- o signs at exit to warn of unknowing entry

## SECURITY

## GENERAL

The building will be kept completely closed and locked at all times, except when authorized personnel are working there. The doorway is monitored by a television camera and computer which records the time and date of every entrance to the building.

A sign is posted on the door denoting that hazardous waste is stored in the building and warning unauthorized personnel to "keep out". The sign lists telephone numbers of people to contact in case of an emergency.

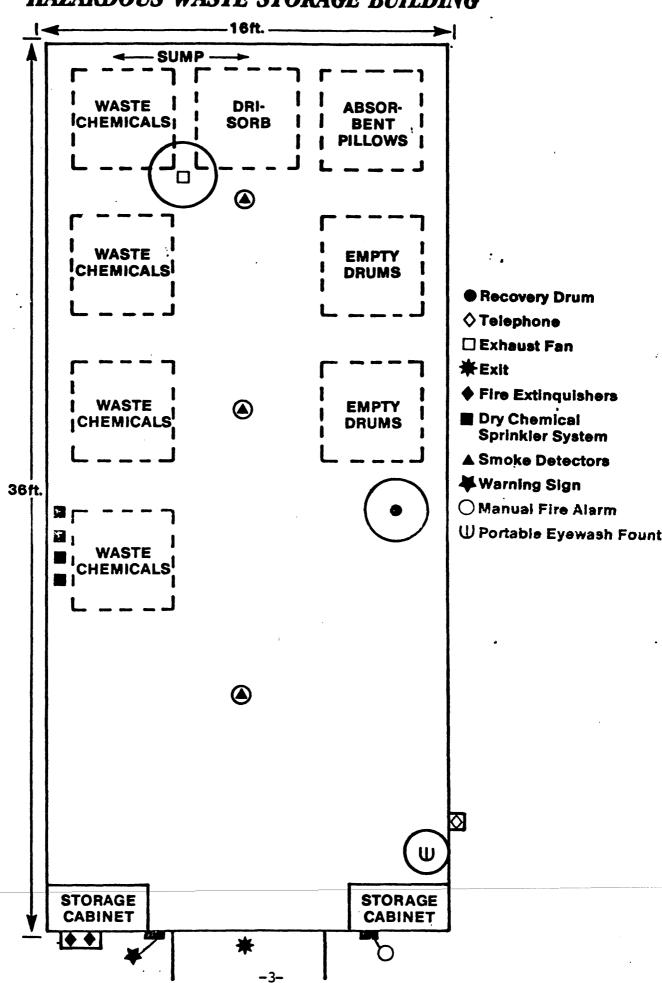
Not less than two employees will work in the area at any time, both having knowledge of the contingency plan, and trained to respond to incidents involving spills, fire or explosions. The employees will wear the proper protective equipment including gloves and safety glasses.

The plant security department, the emergency coordinator and safety supervisor all have keys to the building.

## SECURITY TRAINING & PROCEDURES

The security force has received appropriate training. There are written procedures, and verbal instructions are given to the people who patrol the areas. One officer has had previous police training.

# OLIN KESEAKCH HAZARDOUS WASTE STORAGE BUILDING



## 270.14(b)(5) General Inspections

The purpose of inspections is to check for the proper functioning of emergency equipment, and to discover and respond to any spill, leaks, fires or potentially hazardous conditions which may cause a release of hazardous waste constituents to the environment or cause a threat to human health.

Any equipment failures, or situations which have caused releases to the environment or a threat to human health, the emergency coordinator will be immediately notified. (See contingency plan)

The following areas are inspected:

- 1. Containers, leaks and spills
- 2. Storage area housekeeping
- 3. Warning signs availability
- 4. Safety and emergency equipment

Please find attachment 270.14(b)(5) 1 General Inspection requirements for the storage building. This is kept on file at the facility with the environmental officer.

## GENERAL INSPECTION REQUIREMENTS

## GENERAL INSPECTIONS

All waste drums will be stored inside the waste storage building by compatibility and hazard class. The building is equipped with a dry chemical sprinkler system. Adequate space is maintained between aisles to allow movement of personnel and equipment. Fire and spill control equipment is available in case of an emergency.

## INSPECTION INSTRUCTIONS

The following will be inspected at least once a week.

1) Safety Equipment

Portable Eyewash Scott Air Pack

Respirator Masks

Face Shields Gloves

Absorbent Material

2) Drum Condition

(Inspected For)

Correct Pressure & Water Supply

Properly Charged

Cleaned & Placed in Plastic Bags

with Individual's Name

Number of, available

Number of, available

Number of bags, available

(Inspected For)

Closed Bungs

Corrosion

Correct Labelling, Including Accumulation Start Date

## RECORD KEEPING

Date, time and observations of the inspector will be entered in a logbook along with the name of the person inspecting the facility.

Remedial action, if required, will be verbally reported to the Environmental Affairs Officer and results of the action will be entered in the logbook.

The logbook will be reviewed after each inspection by the inspector's supervisor.

# OF WASTE CHEMICAL STORAGE BUILDING OLIN - CHESHIRE

	COMMENTS
NUMBER OF DRUMS-	
ENTER THE FOLLOWING INFO:	
LEAKING DRUMS	
CORRODED OR DAMAGED DRUMS	
' DRUMS W/OPEN BUNGS	
HOUSEKEEPING	
WARNING SIGNS	
SAFETY EQUIPMENT:	
EYEWASH FOUNTAIN (Pressure)	
SCOTT AIR PACKS (Pressure)	
GLOVES (Quantity)	
FACE SHIELDS (Quantity)	
RESPIRATORS (Condition)	
MASKS (Quantity)	
EMERGENCY EQUIPMENT:	
ABSORBENT PILLOWS (Quantity)	
FIRE EXTINGUISHERS (Pressure)	
RECOVERY DRUMS (Quantity)	
SPEEDY-DRI BAGS (Quantity)	
TELEPHONE (Operational)	
ACTION TAKEN:	
EMERGENCY COORDINATOR NOTIFIED:	

Inspected by: \_\_\_\_\_ Date: \_\_\_\_

Approved by: \_\_\_\_\_ Time: \_\_\_

270.14(b)(6) Preparedness and Prevention

In demonstrating preparedness and prevention for the Cheshire Research Facility, please find attachment 270.14(b)(6)1, a drawing showing movement of waste from the transfer room to the permanent waste storage building.

Attachment 270.14(b)(6)3a shows locations of fire extinguishers in every laboratory. Telephones are also in every laboratory.

Communication system in case of emergency takes place by calling the security desk in the lobby who can voice page the entire building for evacuation purposes. The HWMU has its own telephone and manual fire alarm for warning in case of an emergency. See attachment 270.14(b)(6)3.

Emergency equipment is listed in the contingency plan pages 15-16 and the inspection schedule demonstrates testing procedures.

Arrangements with local authorities please see contingency plan pages 15-18 and letters with emergency services.

- o Fire drills are conducted annually with the Cheshire Fire Department.
- o Campion Ambulance Service has acknowledged receipt of the contingency plan.
- o Hospitals have been notified as stated on page 15 of the contingency plan.

What follows are the design and safety features which contribute to a preparedness and prevention program.

Building features to minimize dangers of waste storage.

- o Floor construction concrete slab 12" in thickness no seams.
- o Sides and roof of building metal construction.
- o Ventilation provided at two ends (door/fans).
- o Secondary containment at end away from door south end in form of gutter with sumps.
- o Floor epoxy coated to prevent migration of wastes into concrete and slopes towards gutter.
- o Designed to provide adequate aisle space for movement of forklift truck.
- o Storage capacity approximately 100 drums three pallets high.

Please find attachment 270.14(b)(6)2 to demonstrate features of drum storage area.

Safety features added to building to minimize dangers of waste storage.

- o Recovery drum
- o Telephone
- o Exhaust fan
- o Fire extinguishers
- o Dry chemical sprinkler system
- o Smoke detectors
- o Warning sign
- o 24 hour TV surveillance
- o Manual fire alarm
- o Portable eye wash
- o Absorbant for spill cleanup

See attachment 270.14(b)(6)3 and 270.14(b)(6)3a for location of safety equipment.

- o Storage procedures within building to minimize dangers of waste storage.
  - o Wastes are stored on pallets 3 pallets high.
  - o Storage takes place according to compatibility scheme for waste segregation. See waste analysis plan.
  - o Reactive wastes stored in safety cabinets at north end of building.
  - o Both sides of aisle can be used if segregation, other than by pallet, is desired. See drawing 270.14(b)(6)3 for a typical scheme of compatibility segregation.
  - o Adequate aisle space provided for forklift truck movement. See attachment 270.14(b)(6)3 to demonstrate that approximately 6 feet of aisle space is available for forklift truck movement.

o Waste handling procedures prior to storage to minimize hazards of waste storage.

#### o Training

All employees and contractors are trained to understand waste collection and handling procedures. See attachment 270.14(b)(3)1 for waste disposal procedures which all employees have a copy of.

### o Small waste pick-ups

Small laboratory bottles and wastes are picked up from laboratories in main building and placed in a satellite area or directly transferred to waste storage building. See attachment 270.14(b)(6)1 site plan with routes of waste pick-ups show satellite transfer area. The cart that makes the rounds also has spill cleanup material.

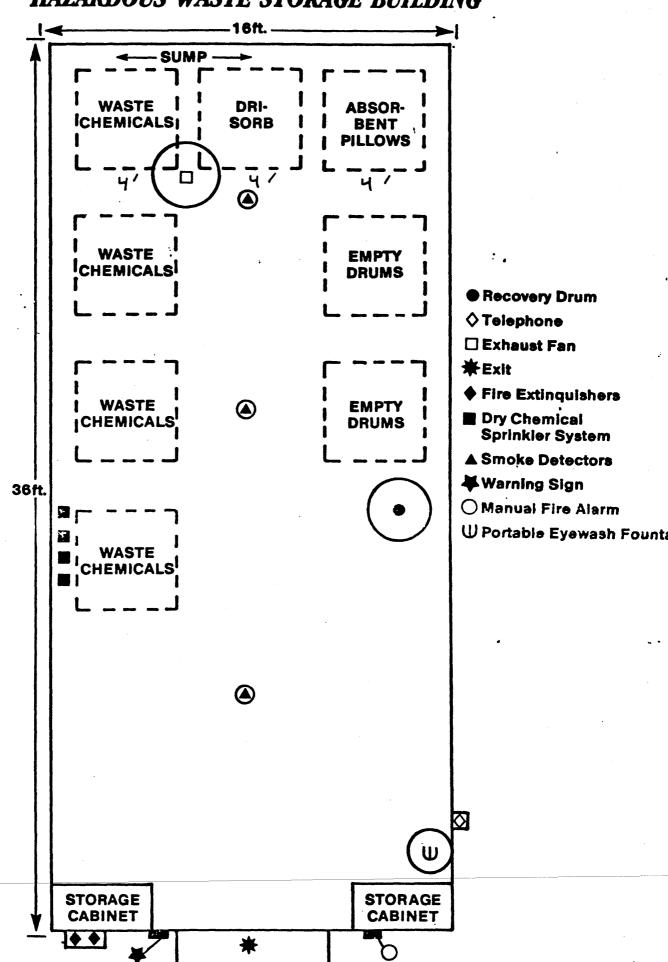
### o Drum waste pick-ups

All drums of waste are kept closed at all times and the environmental affairs officer is notified when a drum needs picking up at a laboratory. See waste disposal procedure page 4 waste analysis plan.

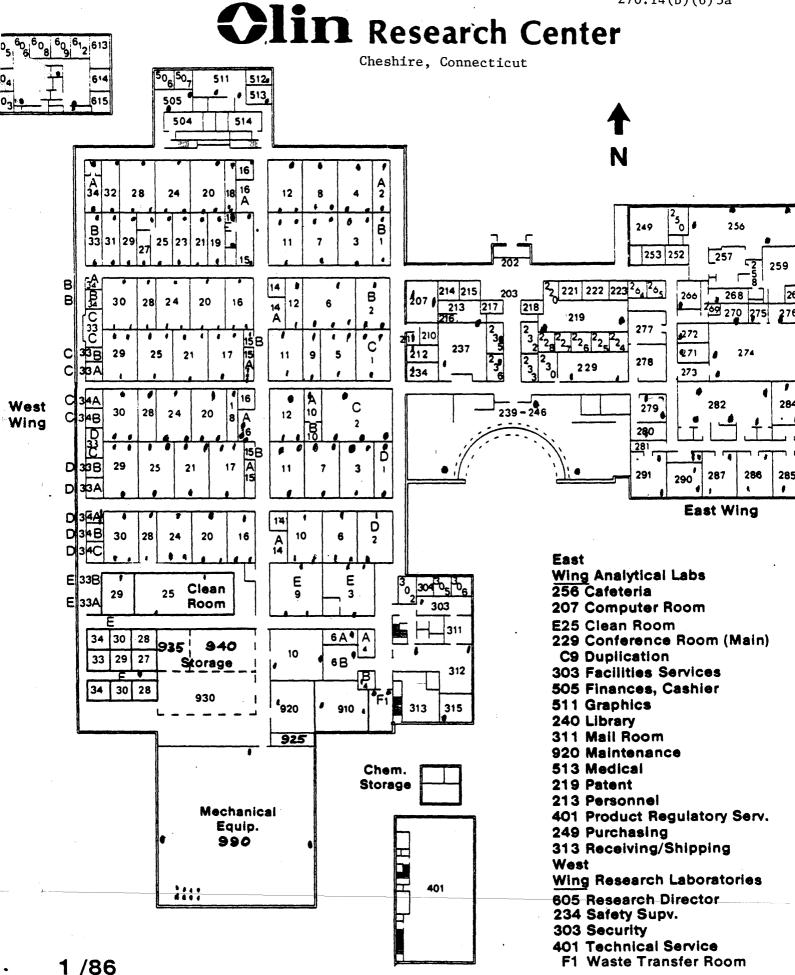
## o Empty container policy

See waste disposal plan for triple rinsing policy on empty containers before discarding in trash.

# OLIN KESEAKCH HAZARDOUS WASTE STORAGE BUILDING



-3-



15

Fire Fytinguicher Locations

# 270.14(b)7 Contingency Plan

Please find a Contingency Plan for Olin's Cheshire Research facility.

It includes a letter demonstrating acknowledgement of knowledge of the contingency plan, from the ambulance service.

The other emergency town services have responded verbally or have visited the site.

OLIN RESEARCH CENTER
CHESHIRE, CONNECTICUT

CONTINGENCY PLAN AND EMERGENCY PROCEDURES

ISSUED: MARCH 22, 1985
REVISED: FEBRUARY 14, 1986
REVISED: JULY 16, 1986
REVISED: OCTOBER 28, 1986
REVISED: DECEMBER 1, 1986
REVISED: NOVEMBER 1, 1988

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#### CONTINGENCY PLAN

#### HAZARDOUS WASTE STORAGE FACILITY

#### E.P.A. I.D. NO. CT D980916779

#### A. PURPOSE

This plan is written in accordance with Title 40 of the Code of Federal Regulations 264 Subpart D and Section 25-54cc(c)-30 and 31 of the Connecticut Hazardous Waste Management Regulations. The plan will be used in the event of an emergency involving hazardous waste at the Olin Research Center.

The contingency plan is designed to minimize hazard to human health and the environment from fire, explosions, toxic spills, or any unplanned, sudden or non-sudden release of hazardous wastes to air, soil or surface water.

The plan describes the types of emergency situations which might occur, how and to whom emergencies should be reported, who is in charge in an emergency, the type of response actions which must be taken, including evacuation procedures, the type and location of emergency equipment and the procedures for handling any recovered wastes or contaminated soil or water after the emergency is over.

The provisions of this plan should be carried out immediately whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.

#### B. SCOPE

The hazardous waste building is a drum storage facility located at a distance of 350 feet, east of the main laboratory building.

The main wastes stored in the building will be:

1. Miscellaneous laboratory chemicals packed with absorbent materials in 55-gallon DOT approved steel drums. The chemicals will consist of the usual materials normally found in laboratories; i.e., solvents, acids, bases, etc.

2. Bulk wastes such as aqueous acid mixtures, acetone washes and other chemicals as described in Table 1.0.

# Emergencies which will be reported

- a. Fire or explosion.
- b. Spills, isolated or ongoing.
- c. Earthquake, hurricane, tornado, flood or other storm damage.
- d. Accident or damage to hazardous waste storage building or handling equipment.
- e. Personal injury.
- f. Bomb threats, riot or act of civil disobedience.
- g. Theft of hazardous wastes.

TABLE 1.0

GENERAL WASTE CATEGORIES

WA	STE STREAM	EPA HAZARD CODE	EPA WASTE TYPE	METHOD OF STORAGE
1)	Acetone from Experiment Clean-Up	Ignitable	D001	55 gal steel drum
2)	Aqueous Acids from Titrations	Corrosive	D002	55 gal steel drum
3)	Lab Chemicals packed with Absorbent	Toxic, Corrosive & Ignitable	D001 & D002	55 gal steel drum
4)	Photographic Wastes	Non-hazardous		55 gal steel drum
5)	Flexible & Rigid Polyol	Non-hazardous		55 gal steel drum
6)	Glycol Ethers	Non-hazardous		55 gal steel drum
7)	Misc. Spill Residue in Absorbent	Toxic	F002 & F003	55 gal steel drum

#### C. RESPONSIBILITIES - REPORTING EMERGENCIES

- 1. In the event of an emergency arising from fire or explosion or other catastrophic facility failure (e.g., hurricane) resulting in fire or the distinct possibility of fire, the person on the scene will immediately notify the Cheshire Fire Department.
- 2. Subsequent to the action described in (1) above or in the event the emergency is a spill or other event not resulting in fire, the person will notify the Emergency Coordinator (see below).
- 3. If the emergency is a small spill outside the drum storage area, the person on the scene may attempt to contain the spill with absorbent prior to receiving instructions from the Emergency Coordinator, if containment can be done without risk to personnel safety.

At all times, there shall be at lease one employee either on the facility premises or on call with the responsibility for coordinating all emergency response measures. This person will be called the <a href="Emergency Coordinator">Emergency Coordinator</a> and will have full authority to commit all the resources needed to carry out the measures provided in this plan. The <a href="Emergency Coordinator">Emergency Coordinator</a> shall be thoroughly familiar with all aspects of the facility's contingency plan, all operations and activities at the facility, and location and characteristics of waste handled, the location of all records within the facility, and the facility layout.

Each designated Emergency Coordinator has the authority to commit the resources needed to carry out this contingency plan, including the authority to request the assistance of commercial emergency response contractors.

#### D. ORGANIZATION AND DUTIES

#### Emergency Response Chain of Command

The Emergency Coordinator for the Olin Research Center is:

W. N. Patterson Environmental Affairs Officer Designees for Emergency Coordinator are:

J. K. McCracken
Manager, Safety & Loss Prevention

J. A. Dreyfuss Facilities & Engineering Manager

An emergency could involve one or more of the above listed people depending on the nature of the emergency and the time of day. In all cases, W. N. Patterson would be notified and he would work with or coordinate the actions of the designees.

In the absence of W. N. Patterson, the Emergency Coordinator would automatically become the person who specializes in the problem area:

Chemical Spills/Person Injury: J. K. McCracken

Fire/Explosions: J. A. Dreyfuss

# E. COORDINATED EMERGENCY SERVICES

When an emergency is reported to the Emergency Coordinator, the Emergency Coordinator or his designee makes an immediate assessment of the situation and takes the following action as appropriate:

Emergency Condition:	Action:
Fire/Explosion	Call Cheshire Fire Department Telephone: 9+911
	Evacuate the area.
•	Take action to extinguish fire without endangering the personal safety of any personnel.
Spills & Gas Releases	Call Cheshire Police Department Telephone: 9+911
Large Spills	Call National Response Center Telephone: 9 (800) 424-8802
Incidents Involving Chemical Shipments	Call National Response Center Telephone: 9 (800) 424-8802

# Emergency Condition:

### Action:

#### ANY OF THE ABOVE INCIDENTS:

- o Call Region I, EPA Telephone: 9 (203) 223-4635
- o Call State Spill Response Center Telephone: 9 (203) 566-3338
- o Call State Police Telephone: 9 (203) 756-0069
- o Have personnel put on personal protective equipment.
- o Contain spills outside storage area with absorbent.
- o Contain drum leaks by plugging or taping holes or inverting drums. Place leaking drums in storage area or in recovery drums.
- o When a spill has been contained cleanup should begin immediately. All spilled material and any liquids resulting from the cleanup will be picked up with absorbent material and placed in closed drums or recovery drums. Any material remaining in a damaged drum will be transferred to a new drum or the damaged drum and its contents will be placed in a recovery drum.
- o If additional assistance is needed to contain and cleanup spilled materials call the Emergency Response Contractor:

# Emergency Condition:

# Action:

O. H. Materials Company Boston, MA Telephone: (419) 423-3526 Joe Kirk

IT Corp.
Norwalk, CT
Telephone: (203) 386-0100
Skip Brennan

Earthquake, Hurricane, Tornado, Flood or other Storm Damage

Accidents or damage to the Hazardous Waste Storage Area or to Handling Equipment

- o Move any drums of wastes from the damaged portion of the storage building.
- o If a fire or spill occurs, follow spill procedures.
- o Remove drums from damaged storage area.
- o Replace damaged dike with absorbent material. Expedite permanent repair.
- o Replace damaged forklifts with other units available at main building.
- o Cleanup any spills which are present.

# Personal Injury

o In cases of contact with wastes, remove contaminated clothing and flush exposed body areas with copious amounts of water. For contact with eyes, immediately flush with large volume of warm water for at least 15 minutes. Call a Hospital from the list on page 15.

# Emergency Condition:

# Bomb Threat, Riot or Act of Civil Disobedience

# Action:

- o In case of burns or other injuries, follow normal first aid practices and call for further assistance and transportation of injured person to the hospital.
- o Call Cheshire Police and Fire Departments (911) and inform them of theft and hazardous nature of materials.

#### F. LIST OF EMERGENCY COORDINATORS

Emergency Coordinator, Olin Corporation, Olin Research Center

W. N. Patterson, 204 West Todd St., Hamden, Ct.

Work Phone: 271-4258 Home Phone: 281-1136

Availability: Mon-Fri, 8:00 AM - 4:30 PM

Comment: W. Patterson must be notified of all emergency situations at work or home.

Alternates - Manager, Safety & Loss Prevention

J. K. McCracken, 2 Blue Hill Road, Middletown, CT

Work Phone: 271-4076 Home Phone: 347-0859

Availability: Mon-Fri, 8:00 AM - 4:30 PM

Comment: Must be contacted at work or home if

W. Patterson cannot be reached.

Facilities & Engineering Manager

J. A. Dreyfuss, 4 Boardman Dr., Prospect, CT

Work Phone: 271-4202 Home Phone: 758-6269

Availability: Mon-Fri, 8:00 AM - 4:30 PM

Comment: Must be contacted if previously listed

coordinator cannot be reached.

Medical Director

Dr. Ronald J. MacDonald

Work Phone: (203) 356-3030

#### G. EMERGENCY PROCEDURES

During the normal workday, there are enough Olin employees on-site so that if an emergency (fire or spill) occurs, someone will notify the security office and the Emergency Coordinator by telephone. The security desk officer in turn will phone the Cheshire Fire Department via the 911 emergency number. The security officer would also notify the Research Center Safety Manager.

If any emergency occurred during the evening hours, the security patrol officer would contact the security desk officer by phone, who in turn would contact the Cheshire Fire Department. If local police were needed to alert residents to a potential hazard, the fire department officials would contact them.

If the local fire department was called out during the evening hours, the Industrial Relations Manager, Charles Lewis would be notified, as well as the Research Center Safety Manager, J. K. McCracken.

#### Emergency Procedures are as follows:

- 1. Whenever there is an imminent or actual emergency situation, the Emergency Coordinator shall immediately:
  - a. Identify the character, exact source, amount and extent of any discharged material;
  - b. Activate the fire alarm system or the voice paging system, where applicable, to notify all facility personnel; and
  - c. Notify appropriate Federal, State and local agencies with designated response roles as specified on pages 5 and 6.
- 2. Concurrently, the Emergency Coordinator shall assess possible hazards to human health or the environment that may result from the discharge, fire, or explosion. This assessment shall consider both direct and indirect effects of the discharge, fire, or explosion.
- 3. If the Emergency Coordinator determines that the facility has had a discharge, fire, or explosion which could threaten human health, or the environment, outside the facility, the Emergency Coordinator shall:
  - a. Immediately notify appropriate local authorities if an assessment indicates that evacuation of local areas may be advisable. The Emergency Coordinator shall be available to help appropriate officials decide whether local areas should be evacuated; and

- b. Immediately notify the Connecticut Department of Environmental Protection at (203) 566-3338. If the Connecticut Department of Environmental Protection cannot be contacted, call the USEPA National Response Center at (800) 424-8802.
- c. When notifying the Connecticut Department of Environmental Protection, report (1) the type of substance; (2) the estimated quantity discharged, if known; (3) the location of the discharge; (4) the actions the person reporting the discharge proposes to take to contain, cleanup and remove the substance, if any, and (5) any other information concerning the discharge which the Department may request at the time of notification.
- 4. During any emergency, the Emergency Coordinator shall take all reasonable measures necessary to ensure that fires, explosions, and discharges do not occur, reoccur or spread to other hazardous waste at the facility. These measures must include, where applicable, stopping operations, collecting and containing released waste, and removing or isolating containers.
- 5. Immediately after an emergency, the Emergency Coordinator shall provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a discharge, fire, or explosion at the facility. All absorbent and other cleanup materials will be placed in closed drums or recovery drums and labeled. The Environmental Officer at the Cheshire facility should be contacted for assistance and direction for removal and disposal of the waste material.
- 6. The Emergency Coordinator shall insure that, in the affected area(s) of the facility:
  - a. No waste that may be incompatible with the discharged material is stored until cleanup procedures are completed; and
  - b. All emergency equipment listed in this contingency plan is cleaned and fit for its intended use before in-transit storage operations are resumed.

- 7. The Regional Administration shall notify the Connecticut Department of Environmental Protection and the Cheshire Fire Department that the cleanup procedures are completed and that all emergency equipment is cleaned and fit for its intended use before storage of wastes is resumed.
- 8. The Emergency Coordinator shall note in the operating record the time, date, and details of any incident that requires implementing the contingency plan. Within 15 days after the incident, the Emergency Coordinator shall submit a written report on the incident to the Connecticut Department of Environmental Protection. The report shall include, but not be limited to:
  - a. Name, address, and telephone number of the owner or operator:

Olin Corporation 120 Long Ridge Road Stamford, CT 06904 (203) 356-2000

b. Name, address, and telephone number of the facility:

Olin Research Center 350 Knotter Drive Cheshire, CT 06410 (203) 271-4000

- c. Date, time, and type of incident;
- d. Name and quantity of material(s) involved;
- e. The extent of injuries, if any;
- f. An assessment of actual or potential hazards to human health or the environment, where this is applicable;
- g. Assessment of the scope and magnitude of the problem;
- h. Description of the immediate actions that have been taken and the estimated quantity and disposition of recovered material that resulted from the incident; and
- i. Provide implementation schedule for undertaking suggested measures to eliminate the problem.

#### H. EMERGENCY AND EVACUATION PLAN

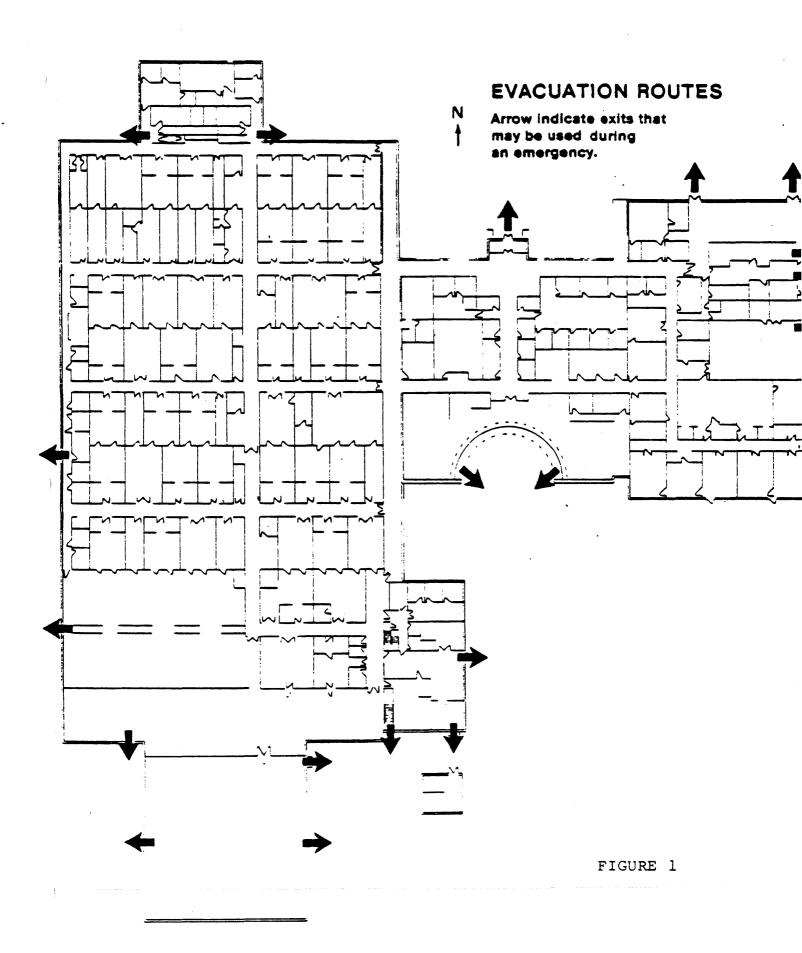
If there is an imminent or actual emergency situation detected by <u>any</u> employee, that employee would call the emergency number by dialing 5555. The console operator or Security Officer, would then notify all facility personnel via the telephone P.A. system. Plant security, medical and emergency team personnel would immediately respond and the designated Emergency Coordinator would determine the seriousness of the emergency and take appropriate action.

All Chemical Research employees are familiar with the following procedure that will be used in any emergency requiring the evacuation of the building.

1. In case of an emergency requiring the evacuation of the building, employees will be notified by means of a "Beep" "Beep" alarm set to march time.

NOTE: A steady "Beep" only indicates a mechanical problem and does not require evacuation.

- 2. Shut off all power, close all hood sashes, and close all doors behind you as you leave.
- Proceed in an orderly manner to the nearest exit.
   (See Figure 1, page 14)
- 4. Assemble in the parking lot north of the building.
- 5. REMEMBER All exits must be kept clear. Know the locations of the nearest fire extinguisher, fire alarm pull station and emergency exit.



#### I. ARRANGEMENTS WITH OUTSIDE EMERGENCY SERVICES

The following have been requested to provide assistance in the event of an emergency:

Cheshire Fire Chief: Douglas Yocher - 272-1828

Cheshire Fire Marshal: James Doherty - 272-1828

Cheshire Police Chief: George Merrian - 272-5333

#### **HOSPITALS**

Waterbury	- 64 Robbins St., Waterbury, CT	573-6000
St. Mary's	- 56 Franklin St., Waterbury, CT	574-6000
Meriden-Wallingford	- 181 Cook Ave., Meriden, CT	238-8200
Yale-New Haven	- 20 York St., New Haven, CT	785-2222
St. Raphael	- 1450 Chapel St., New Haven, CT	789-3000
Campion Ambulance Service	- 3 Country Club Rd., Cheshire	272-0781

The above listed Agencies have been given copies of the contingency plan to familiarize them with the layout of the facility, the properties of the hazardous waste handled at the facility and the associated hazards, evacuations routes which would be used when required.

Arrangements have been or will be made with the hospitals to familiarize their personnel with the properties of wastes handled at the facility and the types of injuries or illnesses which could result from fires, explosions, or releases at the facility.

In addition, the State Fire Code requires the local fire department to inspect the facility on a regular basis with at least two inspections annually.

#### J. EMERGENCY EQUIPMENT

- o The hazardous waste storage building is equipped with a dry chemical sprinkler system.
- o Water can be supplied from a fire hydrant. 500-600 gallons/min.

- o A telephone at the facility which can be used to summon assistance in case of an emergency is located on the outside wall next to the exit.
- o Fire alarm.

  Manual pull station.
- o Portable fire extinguishers. Two 20 lb dry chemical.
- o Safety shower.

  Available in main building.
- o Eyewash unit (portable).
- o First aid supplies.

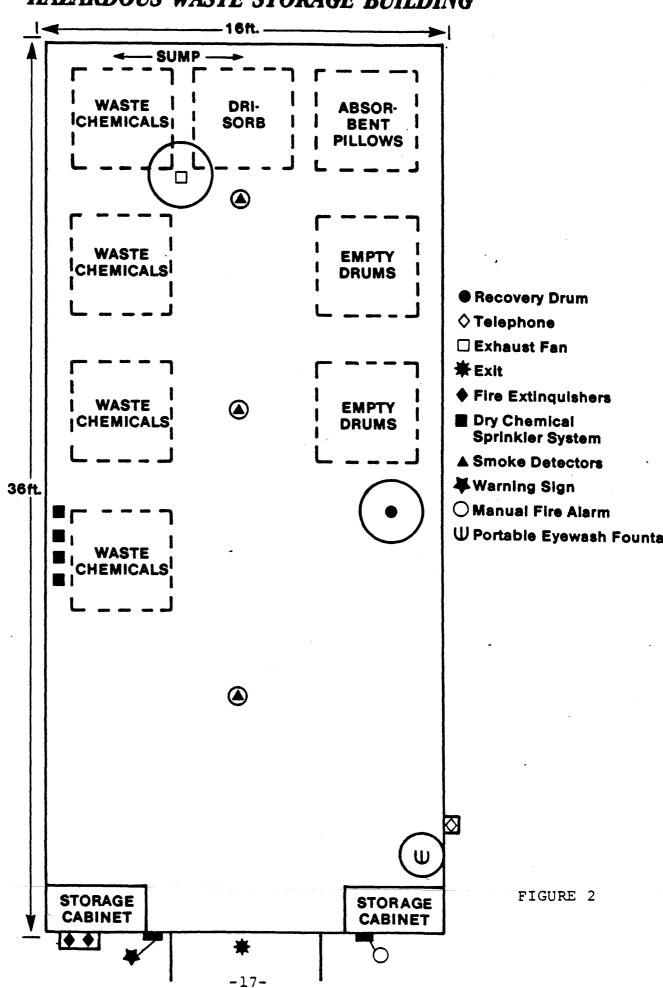
  Available in main building.
- o Recovery drums.
  55 gallon size.
- o Personal safety equipment.

  Two Scott Air Packs, gloves, respirators, face shields.
- o Absorbent materials.

  Speedy-dri, absorbent pillows.

SEE EQUIPMENT LOCATIONS - FIGURE 2, PAGE 17.

# ULIN KESEARCH HAZARDOUS WASTE STORAGE BUILDING



#### K. CONTINGENCY PLAN DISTRIBUTION AND REVISION

A copy of this contingency plan and all revisions to the plan must be maintained at the Research Center. Copies have also been sent to the following: Fire, Police, and Hospitals (see page 15). Each Emergency Coordinator has received a copy of the contingency plan for office use and a second copy to be kept at home.

The contingency plan shall be reviewed, and immediately amended, if necessary, whenever:

- Applicable regulations are revised;
- 2. The plan fails in an emergency;
- 3. The facility changes (in its design, construction, operation, maintenance, or other circumstances) in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency;
- 4. The list of emergency coordinators changes; or
- 5. The list of emergency equipment changes.

#### L. EMERGENCY COORDINATOR RESPONSIBILITIES AND AUTHORITY

At all times, there shall be at lease one employee either on the facility premises or on call with the responsibility for coordinating all emergency response measures. Each Emergency Coordinator shall be thoroughly familiar with all aspects of the facility's contingency plan, all operations and activities at the facility, and location and characteristics of waste handled, the location of all records within the facility, and the facility layout.

Each designated Emergency Coordinator has the authority to commit the resources needed to carry out this contingency plan, including the authority to request the assistance of commercial emergency response contractors.

270.14(b)(9) Ignitable and Reactive Procedures

The following precautionary measures are taken to reduce potential accidental ignition or reaction of wastes while in storage at the Cheshire Research facility.

Ignitable wastes are stored 125 feet from the nearest property boundary. Ignitable wastes are also stored 75 feet from the research facility and accessible by road if response is needed by an emergency vehicle. See attachment 270.14(b)(6)1 preparedness and prevention.

Reactive or incompatible wastes are stored in separate safety cabinets within the waste storage building. See attachment 270.14(b)(9)2.

A system to identify incompatible or reactive wastes is in place and is listed as part of the waste analysis plan and preparedness and prevention procedures to identify these wastes as they are generated by the scientists conducting project research at the Cheshire facility. See waste analysis plan for classification of wastes and preparedness and prevention section for handling procedures.

OLIN RESEARCH Ignitable and reactive HAZARDOUS WASTE STORAGE BUILDING procedure 270.14(b)(9)2 16ft. -SUMP WASTE DRI-ABSOR-CHEMICALSI SORB BENT PILLOWS I WASTE **EMPTY** CHEMICALS **DRUMS** Recovery Drum **♦** Telephone ☐ Exhaust Fan **★**Exit Fire Extinguishers WASTE **EMPTY** CHEMICALS ■ Dry Chemical **DRUMS** Sprinkler System **▲ Smoke Detectors** 🦊 Warning Sign 36ft. Manual Fire Alarm U Portable Eyewash Four WASTE CHEMICALS  $\boldsymbol{\Psi}$ FIGURE 2 STORAGE STORAGE

CABINET

-17-

CABINET

### 270.14(b)(10) Traffic

A plot plan of the Cheshire Research facility is included as attachment 270.14(b)(6)4 (prepardness and prevention). In it are identified the usual traffic patterns at the facility.

- o Employee parking
- o Shipping receiving
- o Hazardous waste loading and unloading

A shipment of 40-45 drums of hazardous waste is usually completed once every three months. The tractor trailer truck will travel out Knotter Drive to one of the major interstates 84 or 91.

Only authorized workers are allowed to work in or around the waste storage building and pedestrian traffic is practically non-existent. 270.14(b)(11) Seismic Standards

No seismic standard applies to the Cheshire facility as it is an existing facility. At this time, also, it is believed that seismic standards are not applicable for this location.

270.14(b)(11) 100 year Flood Plain

#### General

Olin's Cheshire Research facility at Knotter Drive in Cheshire, Connecticut is located on the Federal Emergency Management Agency Flood Insurance Rate Map community panel number 090074-0005B for Cheshire, Connecticut.

The zone designation is zone C which is not in the 100 year flood plain. Zone C is an area of minimal flooding.

Please see attachment 270 .14(b)(12)1 for location of the facility on the flood insurance map.

The Ten mile river flows near the Cheshire location and has a flood elevation of 137'. The elevation of the hazardous waste facility floor is 144' demonstrating that it is, in fact, above the Ten mile river flood elevation. (See preparedness and prevention section for facility's floor elevation.)

NATIONAL FLOOD INSURANCE PROGRAM

# FIRM FLOOD INSURANCE RATE MAP

TOWN OF CHESHIRE, CONNECTICUT NEW HAVEN COUNTY

PANEL 5 OF 10

**COMMUNITY-PANEL NUMBER** 090074 0005B

> **EFFECTIVE DATE:** JULY 16, 1981

#### 270.14(b)(12) Personnel Training

The following program (attachment 270.14(b)(12)1) is in place at the Cheshire and New Haven facilities. It consists of on-the-job training, formal off-site classes and special classes conducted by trained Olin personnel. This program insures that the personnel responsible for handling hazardous waste can perform their duties and maintain compliance for this permit.

In addition, a written job description for each of the waste handling personnel will be kept on file at the site along with documentation of their training records. Additional people will be trained as deemed necessary and their records filed accordingly. All records will be kept at the facility until closure. Former employees' records will be kept for three years from the date the employee last worked at the facility.

Training program consists of annual training to effectively handle:

- (a) emergency procedures
- (b) emergency equipment
- (c) emergency systems

#### (A) Emergency Procedures:

- i. Contingency plan review
- ii. Location of primary and alternate exits
- iii. Evacuation procedures
  - iv. Shut-down operations
  - v. Emergency spill cleanup

#### (B) Emergency Equipment:

- i. Proper use of self-contained breathing apparatus
- ii. Proper use of fire extinguisher and fire hose
- iii. Proper use of respirator
- iv. Emergency spill cleanup material
- v. Proper use of first-aid kits, eyewash stations, emergency showers, etc.

#### (C) Emergency Systems:

- Knowledge of communications system (telephone, alarms, sirens, flashing signals)
- ii. How to assist outside emergency groups (first-aid squad, ambulance corps, fire department, police)
- iii. Procedures to handle emergency outside contractors to assist in cleanup

#### (D) Routine Handling of Hazardous Waste

Facility personnel are trained annually to:

i. Proper operating instructions on forklift driving

- How to properly collect and pack laboratory samples for ii. disposal
- iii.
- Proper labeling of hazardous waste, placarding, etc.
  Preparation of waste manifest, bills of lading and
  procedures for keeping records and maintaining a waste iv. drum inventory.

The following attachment 270.14(b)(12)3 represents new employee orientation for Hazardous Waste Handling.

# HAZARDOUS WASTE HANDLING "NEW EMPLOYEE" ORIENTATION

## Government Regulations

EPA, DOT, RCRA, Contingency Plan

## Company Policy

Stamford Environmental, Contract Services, Auditors Incinerate if possible

#### Cheshire Procedures

- Air water hazardous waste
- Evaporation of solvents
- Cooling water and sewer discharges
- Waste labeling A-F System
- Acceptable containers
- Weekly pick-up from labs Wayne
- Special handling water reactives, peroxides, etc.
- Lab packs packing list cost
- Bulk waste 5 & 55 gallon drums
- Orange green labels
- CSD's waste profile sheets
- Accurate description part of contract
- Use of interceptor tank

#### OLIN RESEARCH TRAINING PROGRAM

The personnel that will be responsible for handling waste are the R&D Environmental Affairs Officer and one Technician trained in the areas of waste collection, segregation and packaging.

Each employee receives on-the-job training and classroom instruction concerning their particular area of involvement with hazardous waste.

In addition, the employees receive instructions on operating a fork truck and proper procedure for moving 55 gallon steel drums. Each operator must attend a seminar and obtain a fork truck operator license once each year, which is issued by the truck manufacturer.

Periodical training sessions will be held as required to renew or update procedures.

A file is kept by the Environmental Affairs Officer for all training sessions held. Certificates of Seminar Completion are placed in the employee personnel file.

All laboratory personnel who generates waste on a daily or occasional basis, periodically receive instruction on the proper classification for disposal at group seminars and monthly department safety meetings.

Members of the security force have received appropriate on-the-job training. There are written procedures and verbal instructions are given to the people who patrol.

The Cheshire Fire Department has visited the Olin Facility and has been made aware of the emergency plans. Cooperation with the Cheshire Fire Department is excellent.

All personnel directly involved in the handling of hazardous waste materials are familiar with the Contingency Plan and are trained to respond to emergency situations.

Classes are conducted yearly by the Safety Department Supervisor on the use and operation of fire extinguishers and Scott Air Packs.

# JOB DESCRIPTION FOR R&D ENVIRONMENTAL AFFAIRS OFFICER

#### GENERAL

Overall responsibility for all areas of environmental affairs concerning hazardous waste disposal, air emissions and water discharges from the Olin Research Laboratories.

# SPECIFIC DUTIES

- 1. Responsibility for the preparation of all reports in the area of air and water compliance and their submission to State and Federal Agencies as required.
- 2. Responsibility for properly preparing all waste for disposal at EPA approved facilities and providing direct supervision of one waste chemical technician.
- 3. Responsibility for training of technical personnel on hazardous waste disposal management procedures.
- 4. Providing classroom instruction and on-the-job training covering DOT and EPA regulations to all personnel who handle hazardous waste.
- 5. Responsibility for the administration of the A-F classification system for packing laboratory waste to insure compatibility.
- 6. Responsibility for the organization and identification of all chemicals in the waste storage building (318).
- 7. Work closely with Olin Corporate Environmental Affairs Department personnel to determine acceptable methods of waste disposal.
- 8. Establish contacts with disposal firms including the inspection and approval of their facilities.
- 9. Work closely with Olin Corporate Purchasing in disposal contract negotiation.

# REQUIRED EDUCATION

- 1. College graduate with chemistry and environmental background or equivalent industrial work experience.
- 2. Must be trained in hazardous waste management procedures, which will enable the instruction of others.

- 3. Knowledgeable of the chemical waste disposal industry and methods of disposal.
- 4. Knowledgeable of DOT and EPA regulations as they relate to the shipping of hazardous materials.

#### TRAINING

- 1. Attendance at corporate training sessions covering company procedures, as they pertain to hazardous waste disposal, air and water compliance.
- 2. Attendance at commercial seminars such as the J. T. Baker Training Courses on Hazardous Material Regulations.
- 3. Self-instruction on updated DOT and EPA regulations from such sources as the Federal Register, Code of Federal Regulations, Title 40, Title 49, Fire Protection Guide, etc.
- 4. Continue review of State and Federal regulations as they apply to all environmental concerns.

The person who has filled the job of Supervisor of Hazardous Waste Management & Environmental Affairs since November 19, 1980 is William N. Patterson.

# JOB DESCRIPTION FOR ENVIRONMENTAL TECHNICIAN

#### SPECIFIC DUTIES

#### (A) Lab Pack - Waste

- 1. Pick up waste chemicals from the various laboratories.
- 2. Store containers by compatibility group on shelves in the Waste Storage Building.
- 3. Pack 15-18 gallons of accumulated material into open head 55 gallon steel drums with sufficient absorbent material to cushion containers and absorb any spill or breakage.
- 4. Prepare a packing list specifying the description and quantity of each container placed in the drum.
- 5. Combine small containers of similar material into 55 gallon drums.
- 6. Properly label and paint identification number on each drum.
- 7. Record information into a logbook which states the type of material, DOT classification, EPA waste number, date material was placed in the drum.
- 8. Move drums to storage building, (318), into proper section.
- 9. Perform weekly inspections of the waste storage building, record results including any deficiencies in logbook.
- 10. In case of minor spills, contain with absorbent material and place in closed drum, label accordingly.

#### Bulk Chemical - Waste

- 1. Verify drum label by visual inspection of contents.
- 2. Paint identification number on each drum.
- 3. Record required information into logbook.
- 4. Sample drum if required by prescribed methods.
- 5. Move drums of waste with fork truck into waste chemical building (318).
- 6. Store drum in the appropriate preassigned area.

#### (B) Analytical Procedure When Required

1. Each sample must be verified as to contents by either infrared analysis, vapor pressure, chromatography or by solubility testing under the supervision of an experienced chemist.

#### (C) Training

Introductory: An overall view of Hazardous Waste Management is given to the employee by the Environmental Affairs Officer. This would include the dangers involved, both to the individual and the environment. Also, an introduction to applicable State and Federal regulations, RCRA, CFR Title 40 and Title 49 are reviewed.

#### On-the-Job Training

- 1. Instruction by a chemist on procedures for performing tests using analytical equipment such as, vapor pressure, chromatography and IR.
- Supervisor instruction on correct packing procedures and preparation of lab waste drums for disposal.

#### Classroom Instruction

- 1. Attendance at commercial waste disposal seminars when offered by qualified corporations.
- 2. Self-study instructional text on the fundamentals of shipping and transporting hazardous waste.
- 3. Review of government regulations as changes are made.

#### (D) Record Documentation

- 1. Certificates of completion for all related courses including dates of courses are placed in the employee's personnel file.
- Training records for former employees are kept for at least three years from the employee's last work day at the facility.

#### (E) Education Required

- 1. High school graduate or equivalent with some college chemistry is required.
- 2. The ability to use good judgment and react promptly in case of a chemical spill.

The person who has filled the job of Environmental Technician since May 27, 1982, is Wayne Johnson.

Attachment 270.14(b)12 2 represents the certificates and memos on the training programs that are operating at the Cheshire and New Haven facilities. It covers years 1987-1988.

#### TRAINING 1987

#### HAZARDOUS WASTE REGULATION SEMINAR

Sheraton Tara
Braintree, MA
Clean Harbors/Hazardous Material Institute
January 21, 1987 - 9 a.m. - 5 p.m. - 8 hours

Attendees:

Winfield Redman William Patterson

#### FOCUS ON SMALL QUANTITY GENERATORS

Connecticut DEP Cheshire, CT January 27, 1987 - 8 hours

Attendee:

William Patterson

#### HAZARDOUS MATERIALS, CHEMICALS AND WASTE MANAGEMENT COMPLIANCE SEMINAR

Transportation Skills, Inc. Atlanta, GA May 7-8, 1987 - 12 hours

Attendee:

William Patterson

#### HAZARDOUS MATERIALS TRAINING - "OCEAN"

Safety Systems, Inc. Cheshire, CT June 5-7, 1987 - 24 hours

Attendees:

William Patterson Wayne Johnson

Ruth Ford

Winfield Redman David Smith

## TRAINING 1988

#### ASBESTOS TRAINING

Charleston EAD Stamford, CT January 21, 1988 - 3 hours

Attendees:

William Patterson Winfield Redman



70 Attendees

AT Various

DATE February 2, 1988

FROM

M. G. Miller

AT Stamford

COPY TO R. S. Hendey

C. G. Seefried

SUBJECT

RCRA ANNUAL HAZARDOUS WASTE TRAINING

A RCRA Hazardous Waste Training Program was conducted in New Haven on January 29, 1988, for the attendee's listed below. The training program covered the following regulations and was eight hours in length.

I. Shipping of Hazardous Waste

Classifying Hazardous Materials
Proper Shipping Names
Reuse of Packages
Manifesting Hazardous Waste
Container Labeling and Marking for Transportation

II. New Regulations from EPA

Landfill Ban Disposal Interim Status Past Disposal Activities Recycling and Waste Minimization Connecticut Regulations

III. RCRA Regulations Regarding Hazardous Waste Management

Definition of Solid Waste (Hazardous)
Generator Standards 40 CFR 262
Accumulator Standards 40 CFR 265.16 - Subports C-D-IJ
Facility Standards 40 CFR 265 Subport B

Marilyn G. Miller

MGM/ab

#### Attendees:

James Dreyfuss Wayne Johnson Al Milford Bill Patterson Dave Smith Bud Redman Olin Corporation Emergency Action Network



# Certificate of Recognition

WAYNE JOHNSON

inis is to certify that.					
has completed the	HAZARI	OUS	MATE	ERIALS	_training
program on this the	7th day of	June ,	1987		J
Name of i	M: Ora Sen		13	Dem	
Plant Co-ord	linator		Ma	anager OCEAN	

Ocean is a trademark of Olin Corporation — 120 Long Ridge Road, Stamford, CT 06904-1355

# THIS IS TO CERTIFY THAT

W.W. Patterson

# ATTENDED "FOCUS ON NEW REGULATIONS AND PROGRAMS," A CONFERENCE ON HAZARDOUS WASTE MANAGEMENT ON JUNE 7, 1988

Topics discussed at the conference included:

- \*New Tank Regulations
- \*Land Ban Regulations
- \*Waste Miniminization



- \*Transfer Bill
- \*State and Federal Superfund Program
- \*D.E.P.'s Enforcement Program

This program, presented by the Connecticut Department of Environmental Protection and the Connecticut Hazardous Waste Management Service, can be considered part of the training required for hazardous waste generators and small quantity generators pursuant to Connecticut Hazardous Waste Management Regulations.

270.14(b)(13) Closure Plan - Hazardous Waste Storage Area

The facility will be closed on December 27, 2099.

EPA Facility Identification Number CTD 0980916779.

Owner Name:

OLIN CORPORATION

120 Long Ridge Road, Stamford, CT 06904

Phone (203) 356-2000

Operator's Name:

Same as above

Facility Address: 350 Knotter Drive, P.O. Box 586

Cheshire, CT 06410-0586

Facility Contact: James A. Dreyfuss

Facility Manager

General Information

Size Number and Description of Facilities

There is one storage area for containers of hazardous waste. It consists of a storage building for long-term storage of containers being held for shipment for off-site disposal.

"Total storage capacity for the facility is 5,500 gallons."

The only equipment will be pallets and a forklift truck for movement of drums.

Partial closure would consist of closing a portion of the building for drum storage and will follow the same procedures set forth for final closure plan.

The schedule for final closure is as follows:

- 1. The Department of Environmental Protection and the EPA regional administrator will be notified at least 45 days prior to July 1, 2099 when closure is expected to begin.
- 2. The anticipated date when wastes will no longer be received by the facility is June 1, 2099.
- 3. Closure is expected to begin on July 1, 2099.
- All containers of hazardous waste will be shipped off-site by September 28, 2099.
- Final closure is expected to be complete by 5. October 26, 2099.

6. Prior to or before December 27, 2099 Connecticut Department of Environmental Protection and EPA regional administrator will be notified by certified mail that the closure has been completed and certified and signed by a registered professional engineer and the owner and operator of the facility.

#### Removing ALL inventory

All 5,500 gallons of hazardous waste, if present at the time closure begins, will be removed and sent for off-site recovery or disposal at a permitted facility. The drum storage area will be decontaminated to remove any hazardous waste residue that may remain. All of these wastes, including the cleaning residues, will be disposed of in a permitted facility. After closure is complete, no hazardous waste will remain on-site and no post closure care is required.

Decontaminating the facility

The steps necessary to decontaminate the facility.

- Transfer all hazardous wastes off-site for disposal or recovery.
- 2. Wash and clean walls, floors and secondary containment devices of hazardous waste residues. Test collected washwaters for ignitability, ph, total halogenated carbons and trace metals. Dispose or treat all washings at an appropriate facility.
- 3. After decontamination the storage area can be used for other purposes.

#### Closure Certification

Closure of the hazardous waste storage area will be supervised by Olin Corporation and an independent registered professional engineer. They will both submit certification to the Department of Environmental Protection and the regional EPA that the facility has been closed in accordance with the specifications in the approved closure plan.

It is estimated that a certifying engineer may make two inspections during closure. They are a familiarization inspection when the storage area is taken out of service and an inspection of the areas when decontamination has been completed. 270.14(b)(13) Post Closure Plan Documentation

Not applicable. Post closure care is not required of container storage areas when no hazardous waste will be left on-site after closure.

# CHESHIRE HAZARDOUS WASTE FACILITY

# CLOSURE COST ESTIMATE

1.	WASTE DISPOSAL		
	37 Drums solid wastes - Incineration @ \$500/drum	\$18,500	
	- TL Freight	820	
	•		19,320
	36 Drums bulk liquids - Incineration @ \$25/drum	900	
	- TL Freight	2,330	
	- Empty drum disposal @ \$9.60/drum	345	0.575
			3,575
	24 Drums liquid wastes - Aqueous treatment @ \$150/drum	3,600	
	- TL Freight	400	
			4,000
	3 Drums special wastes - Chemical/Physical treatment		
	@ \$275/drum - LTL Freight	825 750	
			1,575
	100 5	<b>.</b>	00 / 70
	100 Drums Total dispos	sal costs	28,470
2.	LABOR		
	Load wastes, decontaminate facility, pallets & equipment		
	2 contract laborers x 3 days x 8 hours/day x \$25/hour	1,200	
	1 supervisor x 3 days x 8 hours/day x \$40/hour	960	2,160
2	TOWN DOWN DOWN		•
3.	EQUIPMENT RENTAL		
	Forklift, steam generator, industrial vacuum		900
4.	MISCELLANEOUS SUPPLIES		
	Detergent, personal protective equipment, disposal conta	iners	500
5.	LABORATORY ANALYSIS OF WASHWATER		300

# 6. DISPOSAL OF WASHWATER

5 Drums @ \$200/drum	1,000
7. INSPECTION AND CERTIFICATION BY A PROFESSIONAL ENGINEER (includes clerical costs)	1,000
TOTAL DISPOSAL, DECONTAMINATION, INSPECTION AND CERTIFICATION COSTS	\$34,330
15% Administrative costs	5,150
20% Contingency	6,870
Total closure costs	\$46,350

#### FINANCIAL ASSURANCE DEMONSTRATION

Financial assurance for the hazardous waste facilities is being demonstrated by use of the financial test based on 1987 fiscal results for Olin Corporation. The following three items are attached to show Olin meets the test:

- 1. A letter from Olin's Chief Financial Officer.
- 2. An Olin 1987 Annual Report with an independent certified public accountant's examination report on page 31.
- 3. A special report from Olin's independent certified public accountant.

The corporate guarantee for Tri-Star Sports, Inc. was previously submitted and remains unchanged.



#### 120 LONG RIDGE ROAD, P.O. BOX 1355, STAMFORD, CT 06904-1355

#### Letter From Chief Financial Officer

Connecticut Reversion Analyst USEPA CT/ME Waste Management Branch JFK Federal Building Room 1903 Boston, MA 02203

Dear Sir or Madam:

I am the chief financial officer of Olin Corporation, 120 Long Ridge Road, Stamford, CT 06904. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in Subpart H of 40 CFR Parts 264 and 265.

The firm identified above is the owner or operator of the following facilities for which liability coverage for sudden accidental occurrences is being demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265:

Name of Facility	Address or Location	EPA Identification Number
Cheshire Research Center	50 Knotter Drive Cheshire, CT 06410	CTD-980916779
New Haven Research Center	P.O. Box 30-275 New Haven, CT 06511	CTD-001451004
Waterbury Plant	P.O. Box 270 Waterbury, CT 06720	CTD-053704110

The firm identified above guarantees, through the guarantee specified in Subpart H of 40 CFR Parts 264 and 265, liability coverage for sudden accidental occurrences at the following facilities owned or operated by the following: None. The firm identified above is the direct or higher-tier parent corporation of the owner or operator.

1. The firm identified above owns or operates the following facilities for which financial assurance for closure or post-closure care or liability coverage is demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimate covered by the test are shown for each facility:

	Closure Cost	Post-Closure Cost
E.P.A. I.D. No. CTD 980916779 Cheshire Research Center 50 Knotter Drive Cheshire, CT 06410	\$ 46,350	<b>\$</b> -
E.P.A. I.D. No. CTD 001451004 New Haven Research Center P.O. Box 30-275 New Haven, CT 06511	110,435	-
E.P.A. I.D. No. CTD 053704110 Waterbury Plant P.O. Box 270 Waterbury, CT 06720	52,097	-

2. The firm identified above guarantees, through the guarantee specified in Subpart H of 40 CFR Parts 264 and 265, the closure and post-closure care or liability coverage of the following facilities owned or operated by the guaranteed party. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility:

	Closure Cost	Post-Closure Cost
E.P.A. I.D. No. CTD 052544376 TriStar Sports, Inc. Middletown Plant 475 Smith Street Middletown, CT 06457	\$ 49,120	<b>\$</b> -

3. In States where EPA is not administering the financial requirements of Subpart H of 40 CFR Parts 264 and 265, this firm is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure or post-closure cost estimates covered by such a test are shown for each facility:

	Closure Cost	Post-Closure Cost
E.P.A. I.D. No. GAD 040690737 Augusta Plant P.O. Box 1234 Augusta, GA 30913	\$ 23,015	\$12,355,330
E.P.A. I.D. No. TXD 008097487 Beaumont Plant P.O. Box 30 Beaumont, TX 77704	280,822	-
E.P.A. I.D. No. CAD 009702564 Benicia Plant 992 Taylor Street Benicia, CA 94510	11,540	-
E.P.A. I.D. No. OHD 045214947 Brook Park Plant 6367 Eastland Rd. Brook Park, OH 44142	222,420	-
E.P.A. I.D. No. TND 003337292 Charleston Plant P.O. Box 248 Charleston, TN 37310	682,360	1,124,430
E.P.A. I.D. No. KYD 006396246 Doe Run Plant P.O. Box 547 Brandenburg, KY 40108	349,505	-
E.P.A. I.D. No. ILD 006271696 East Alton Main Plant East Alton, IL 62024	149,340	-
E.P.A. I.D. No. ILD 000802801 Energy Test Range Ordnance Products Drawer G Marion, IL 62959	41,765	-
E.P.A. I.D. No. KSD 000203638 Kansas City Plant (OWS) 3155 Fiberglass Road Kansas City, KS 66115	49,980	-
E.P.A. I.D. No. LAD 008080681 Lake Charles Plant P.O. Box 2896 Lake Charles, LA 70602	462,475	2,313,000

	Closure Cost	Post-Closure Cost
E.P.A. I.D. No. ALD 008188708 McIntosh Plant P.O. Box 28 McIntosh, AL 36553	\$ 237,070	\$6,237,660
E.P.A. I.D. No. NYD 002123461 Niagara Falls Plant P. O. Box 748 Niagara Falls, NY 14302	633,430	-
E.P.A. I.D. No. IL 8143609487 Ordill Industrial Area Ordnance Products Drawer G Marion, IL 62959	49,595	-
E.P.A. I.D. No. IND 980614051 Signal Products Operation 300 North 500 West Peru, IN 46970	3,200	-
E.P.A. I.D. No. NYD 002220804 Rochester Plant P. O. Box 205 Rochester, NY 14611	946,295	-
E.P.A. I.D. No. FLD 047096524 St. Marks Powder Operation P.O. Box 222 St. Marks, FL 32355	24,780	-
E.P.A. I.D. No. CAD 009552944 Olin Hunt Specialty Products Inc. 4265 Charter Street City of Vernon Los Angeles, CA 90058	21,930	· _
E.P.A. I.D. No. OH4210090003 Physics International Company Load Line #6 Ravenna Army Munitions Plant Ravenna, OH 44266	21,885	-
E.P.A. I.D. No. CAD 000626762 Physics International Company Tracy Test Site 3.2 Miles West of I580 on Corral Hollow Road Tracy, CA 95376	16,975	

- 4. The firm identified above owns or operates the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to EPA or a State through the financial test or any other financial assurance mechanisms specified in Subpart H of 40 CFR Parts 264 and 265 or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: None.
- 5. This firm is the owner or operator of the following UIC facilities for which financial assurance for plugging and abandomment is required under 40 CFR Part 144. The current closure cost estimates as required by 40 CFR 144.62 are shown for each facility: None.

This firm is required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31st. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended December 31, 1987.

Part B. Closure or Post-closure Care and Liability Coverage

#### Alternative II

1.	Sum of current closure and post-closure cost estimates.	\$	26,516,804
2.	Amount of annual aggregate liability coverage to be demonstrated.	\$	2,000,000
3.	Sum of lines 1 and 2.	\$	28,516,804
4.	Current bond rating of most recent issuance of this firm and name of rating service.	1	Baa2 Moody's
5.	Date of issuance of bond.		06/24/87
6.	Date of maturity of bond.		06/15/97
7.	Tangible net worth.	\$	582,000,000
8.	Total assets in U.S.	<b>\$</b> 1,	479,000,000

		YES	NO
9.	Is line 7 at least \$10 million?	X	
10.	Is line 7 at least 6 times line 3?	x	
*11.	Are at least 90% of the firm's assets located in the U.S.? If not, complete line 12.		x
12.	Is line 8 at least 6 times line 3?	X	

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151 (g) as such regulations were constituted on the date shown immediately below.

C. Robert ally

Senior Vice President and Chief Financial Officer

October 31, 1988

CRT:rpa



#### 120 LONG RIDGE ROAD, P.O. BOX 1355, STAMFORD, CT 06904-1355

#### Letter From Chief Financial Officer

Dr. Stephen W. Hitchcock, Director Hazardous Materials Management Unit Department of Environmental Protection State Office Building 165 Capitol Building Hartford, CT 06106

#### Dear Sir:

I am the chief financial officer of Olin Corporation, 120 Long Ridge Road, Stamford, CT 06904. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in Subpart H of 40 CFR Parts 264 and 265.

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2.	Amount of annual aggregate liability coverage to be demonstrated.	\$	2,000,000
3.	Sum of lines 1 and 2.	\$	28,516,804
4.	Current bond rating of most recent issuance of this firm and name of rating service.		Baa2 Moody's
5.	Date of issuance of bond.		06/24/87
6.	Date of maturity of bond.		06/15/97
7.	Tangible net worth.	\$	582,000,000
8.	Total assets in U.S.	<b>\$</b> 1	,479,000,000

		YES	NO
9.	Is line 7 at least \$10 million?	X	
10.	Is line 7 at least 6 times line 3?	x	
*11.	Are at least 90% of the firm's assets located in the U.S.? If not, complete line 12.		x
12.	Is line 8 at least 6 times line 3?	X	

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151 (g) as such regulations were constituted on the date shown immediately below.

C. Robert Tully
Senior Vice President and
Chief Financial Officer

October 31, 1988

CRT:rpa



Olin

Corporation

Annual

Report

1987

Olin Corporation's business is primarily in chemicals, metals and applied physics, with special emphasis on electronic materials and services, aerospace/defense, and water quality management.

Olin's dedication to product quality and customer service continues to make it the supplier of choice in many industries. This report contains numerous examples of why customers choose Olin to supply their needs.

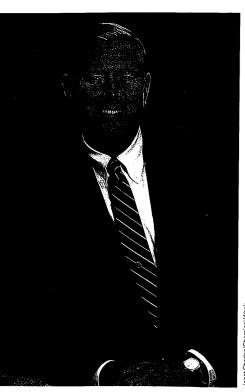
#### Contents

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# **Financial Highlights**

Years ended December 31 (In millions, except per share amounts)	1987	1986	1985	1984
Net Sales and Operating Revenues	\$1,930	\$1,732	\$1,760	\$1,816
Operating Income (Loss)	149	106	(265)*	112
Net Income (Loss):				
Continuing Operations	78	75	(190)*	74
Discontinued Operations			25	15
Net Income (Loss)	78	75	(165)	89
Per Share (Assuming Full Dilution):				,
Continuing Operations	3.32	3.13	(8.28)*	2.96
Discontinued Operations			1.09	.58
Net Income (Loss)	3.32	3.13	(7.19)	3.54
Net Cash Flows From Operating Activities	206	173	97	210
Net Cash Used By Investing Activities	157	135	151	169
Research and Development Expenditures	62	56	54	52
Depreciation	114	111	126	137
Cash Dividends:				
Total	37	34	35	32
Per Share	1.60	1.525	1.50	1.365
Average Shares Outstanding (Assuming Full Dilution)	23.6	25.4	23.0	26.3
As of December 31		_		٠,
Total Assets	\$1,685	\$1,545	\$1,598	\$1,793
Property, Plant & Equipment, Net	727	720	718	796
Working Capital—Net	276	210	304	367
Long-Term Debt	392	375	354	369
Shareholders' Equity:				
Total	700	654	687	867
Per Share	31.81	30.56	29.89	37.88
*Note: Evaluating a appoint observe of \$330 million (\$230 million after to				

<sup>\*</sup>Note: Excluding a special charge of \$330 million (\$230 million after tax), operating income would have been \$65 million and net income from continuing operations would have been \$40 million, equal to \$1.73 per share.



President and Chief Executive Officer, John W. Johnstone, Jr.

Dear Fellow Shareholder,

I'm pleased to report that Olin's operating income was up 41 percent in 1987; it was a good year for our company. We have taken a number of actions to further improve Olin and position it for future growth. The most important of these is our attention to the needs of the customer. The success of this company and our improving financial results are directly related to the focused relationships we have with our customers. You will see a great deal concerning these relationships in the pages of this report.

For nearly a year I have been emphasizing to our employees and the financial community that increasing shareholder value is my prime objective as the new chief executive, and growth will be a natural extension of that value. While the stock market turmoil in October pulled our share *price* down, Olin's shareholder *return* actually increased modestly on a year-to-year basis.

I have set a return on equity (ROE) goal of 14 percent for 1988, as shown in the accompanying bar chart. This assumes a reasonably stable economy and the successful conclusion of our stock repurchase program. Olin's ROE has recently averaged about 11 percent, a level that is not satisfactory to us. One reason for that poor showing is that we've had a number of profit detractors to deal with in recent years. Our restructuring program, which began in late 1985, positioned Olin for improving results, and we are now concentrating our resources on further increasing the value of our company. However, achieving an improved ROE for 1988 will not be enough. Consistency of financial performance is the real issue; Olin must provide attractive returns for sustained periods. While we have a goal of 14 percent ROE, we are committed to that level as a *minimum* for the longer term. Once achieved, it will be a cornerstone on which we can build consistent financial performance and increasing returns.

During the year we accelerated the repurchase of Olin common shares as a result of the market-wide decline in stock prices. At present levels, we view Olin's shares as attractive given their intrinsic value, and therefore we plan to complete our five million share buy-back this summer, a full year ahead of schedule. At year-end we reached the 3.5 million share mark in this program.

On the financing side, in June we issued \$125 million of subordinated notes. This action will move us closer to a targeted capital structure of 40 percent debt and 60 percent equity. We believe this will leverage our resources to a degree that is more appropriate considering our strong cash flow and ability to service debt.

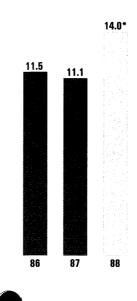
Specific actions we have taken during the year to improve our operations are presented in the business review section that follows. It is a good report, and I will not review those efforts here except to say that our employees have responded admirably to the challenge of improving our product lines, processes and procedures, all aimed at improving productivity and customer satisfaction. These are keys to our future success at Olin. We have stressed a corporate-wide attention to the people who pay the bills—our customers—and have decided to share some examples with you. These companies have placed their trust in Olin, and we work hard to fulfill that obligation each and every day. Concerning productivity, significant strides have been made in improving our gross margins. Break-even points are down. and Olin's overall productivity is steadily improving. Our 1988 margins should be 20 percent above the 1985 level. These improvements, driven by our need for cost reduction, have steadily increased Olin's operating income, as the bar chart illustrates. The lower dollar and price increases in some key product lines have contributed to our success. Innovative approaches and just plain hard work of our employees have made the difference. They are a dedicated and proud group.

The turnaround at our Olin Hunt Specialty Products subsidiary has been dramatic, thanks in large part to the efforts of the management team and improvements in markets for our electronic chemicals. To further capitalize on this improvement, we announced the consolidation of the Olin Hunt organization into the Chemicals Group. This will enable Olin Hunt to additionally benefit from the Group's support structure in the areas of manufacturing, research and development, and financial management.

Chemicals operating income improved 34 percent as a result of productivity improvements and higher utilization rates. Cost improvement as well as ongoing investments in plant and equipment are critical for all our chemical businesses. We are also focusing on a consolidation of manufacturing sites from remote locations to Doe Run, Ky. This offers us economies of scale, critical mass of technical resources, improved processes and other efficiencies that will increase Olin's profitability.

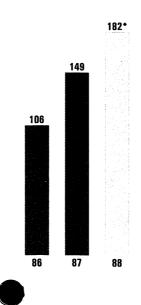
Focusing on profit detractors continues to be a major strategic emphasis. There are no sacred cows at Olin, and we are not reluctant to ask the tough questions. We have a specific process for deciding whether to fix, sell or discontinue a business. An example of this

Return on Ending Equity (percent)
\*Projected goal



# Operating Income

(\$ millions) \*Projected goal



process was our decision to completely exit the firearms manufacturing business. In November we announced the divestiture of our interest in O.K. Firearms, Olin's joint venture for shotguns in Japan. With a declining sporting firearms market worldwide, we did not believe this venture offered the kind of returns required for the long term. This decision permits our Winchester Division to concentrate on our leading market position in sporting ammunition. The issue of strategic fit must also be addressed. An otherwise attractive business may not be compatible with our strategic plan. Examples of such divestitures in 1987 include Larse, SunOlin and Perimed. This process of strategic portfolio management will continue to be an ongoing effort.

Much has been said about the prospects for declining military appropriations in the years ahead, as agreements are reached on reductions of nuclear arsenals. However, we believe there will be a shift in emphasis to conventional weapon systems, and that is Olin's area of expertise. Historically, Olin has been very strong in small and medium caliber ammunition and the powder that goes into these products. We are now entering the large caliber ammunition business, an even greater opportunity for Olin. Beyond our significant position in ordnance and in managing government-owned arsenals, there is high growth available to Olin from our strong technology base. We are recognized technology leaders in small rocket propulsion, high power microwaves, simulated nuclear effects, and in armor/antiarmor technology. The consolidation of these activities during the year into a Defense Systems Group significantly expands our prospects for growth and profitability in both defense and aerospace. Dr. George Sutherland and Mr. Bernard Beckelman, chairman and president, respectively, of the former Rockcor companies, retired from Olin in October. Their special efforts have made possible the successful integration of Rockcor into Olin.

Our Brass Group is the recognized leader in copper alloys in North America, and significant investments were made during the year to maintain that leadership role. Our aim is to grow this business into a position of worldwide leadership. We intend to capitalize on our technical superiority in brass strip, specialty alloys, clad metals, and fabricated products. An excellent first step in this strategy is the joint venture with Yamaha in Japan, where we are beginning to produce high performance alloys.

International growth is a key objective for us. Olin has not been a major player in world markets. Our goal is to double Olin's international participation by 1991. This will be accomplished through selective joint ventures, off-shore manufacturing and exports. Growth will

come from optimizing our technology leadership and expanding key businesses abroad, such as our new joint venture in Venezuela which will produce feedstocks for an existing polyols joint venture.

As a result of what we are doing today, I believe Olin is in the process of becoming a better company. While growth is important, we have absolutely no desire to grow just for the sake of growth. We will practice discipline, selectivity, and timely action—and that will enable us to produce a consistently improving return on equity. To assist me in these endeavors, the Board of Directors in October elected Donald W. Griffin and Robert L. Yohe as corporate executive vice presidents, responsible for defense systems and chemicals, respectively. They join Richard R. Berry, an executive vice president since 1983, who is responsible for our metals and interconnect materials businesses, as well as international operations. These seasoned executives are also responsible for pursuing excellence in such areas as sales and marketing, research and commercialization, and manufacturing and engineering.

We're very proud of our social responsibility efforts, including our program that provides matching funds to employee and retiree donations to education, the arts, and cultural organizations. Funding is also provided for special initiatives such as Liberation Programs, which teaches students in Stamford, Conn., to say "no" to drugs. Olin also funded a program with the Boy Scouts of America to supply the booklet, "Drugs: A Deadly Game," to schoolchildren throughout Fairfield County, Conn. Social responsibility funds are derived from the independent resources of the Olin Corporation Charitable Trust. I mention the substance abuse issue in particular because the problem is a pervasive one in our society, and you should know that Olin is considered a leader in providing this important community assistance.

A tribute to our retiring chairman, John M. Henske, appears on page 32 of this report. John has done much in his 19 years with Olin to move the company forward. In the last year I have experienced firsthand the demands of being the CEO, and I appreciate even more today the many difficult decisions John has made over the years. I will look for his counsel as a continuing member of the Board of Directors.

John W. Thota Tr.

John W. Johnstone, Jr. President and Chief Executive Officer February 29, 1988

	Products and Services	Markets	1987 Performance	Factors Affecting Growth
Chemicals	Electrochemicals	Bleach manufacture, pulp and paper, PVC manufacture, water purification, chemical manufacture	Very strong demand for chlorine and caustic led to record industry operating rates allowing upward movement on pricing.  Chlorate and KOH pricing also benefited from strong demand and higher operating rates.	The mix of end use is widely varied. Since markets are mature, growth will be at GNP rates.
	Cleaning products and services	Raw materials for household/industrial and institutional cleaners including phosphates and chlorinated isocyanurates	CDB chlorinated isocyanurates and phosphates were adversely impacted by consumer conversion to liquid household cleaning products and the ban activity on phosphates. New specialty surfactant products were introduced.	Opportunities for growth lie in penetrating the market for the specialty surfactants.
	Urethane chemicals (polyurethane foams)	Flexible foam for furniture, carpet underlay and transportation; rigid foam for thermal insulation, and non-foam for coatings and elastomers	TDI expansion completed providing Olin a substantially increased worldwide presence; developed a high solids polymer for use in automobile production.	Strong furniture market; sustained domestic auto sales; new applications for specialty urethanes.
	Organics	Specialty surfactants for industrial and institutional detergents; water based metalworking/hydraulic fluids, automotive brake fluids	Increased emphasis on specialty surfactants and functional fluids for specialized end use applications.	Trends in household, industrial and institutional detergents; continued hig level of industrial production.
	Specialty chemicals	Biocides for anti-dandruff agents in shampoos and preservatives used in metalworking fluids; hydrazine used in rocket propellants, as an intermediate in plastics and as oxygen scavenger in industrial boilers	Biocide sales substantially surpassed 1986 record levels; continued strong performance for the hydrazine solutions business; automotive thrust defined in Specialty Chemicals Group.	Stringent government regulations will provide opportunity for an expanded role in biocides; use of hydrazine propellants by the U.S. space program will create solid sales volume.
	Pool chemicals/water quality management	Home and commercial pool sanitizing and related products; water treatment chemicals, services and equipment for industrial, commercial and home use	Increased market share for Olin's major brands— <i>HTH, Pace</i> and <i>Sun</i> —contributed improved earnings; established position in the automated pool systems market. Introduction of Pro-tech waste water treatment program of application technology and service and new Module product line. Service de-ionization business established in Australia.	International efforts will add to performance. New products and continued process improvements will strengthen market presence. Restructure of Continental Water Systems will enhance performance.
	Photoresists; acids and solvents; dopants	Worldwide semiconductor manufacturers	Successfully introduced Series 500 and application-specific photoresists. Sales of acids and solvents increased significantly, reflecting market acceptance of Semiconductor Grade and Certified Particle Grade chemicals.	Finer device geometries will provide opportunities for higher resolution photoresists and ultra high purity chemicals. Growth of Application Specific Integrated Circuits (ASIC) provides opportunity for photoresists.
	Toners; developers; ink jet fluids	Original equipment manufacturers of office copiers, non-impact computer printers in North America, Europe and Asia	Sales increased, strong new product development activity ongoing with several large OEM's worldwide.	Tremendous potential for non-impact computer growth through 1990's. Will support investment in OEM technical and application programs.
	Etchants; plating chemicals; dry film photoresist and imaging equipment	Printed wire board manufacturers	Increased sales and market share. New product introductions. Improvements in electroless copper product line. Continued esearch and development in <i>Blackhole</i> , a new through-hole technology, with testing in late 1987.	Strong growth anticipated with expanding needs of computer industry and new product developments.
	Polymer thick film and coatings	Membrane switch/keyboard manufacturers	Sales up from 1986 due to growth in defense, medical technology and keyboard markets.	Opportunities in new industries. Programs now in Pacific Rim.
	Color chemical systems; color paper	Photofinishing, mini-lab and professional market segments	Substantial increase over 1986 in worldwide markets. Continued market share increase in mini-lab sector, including private labeling to major original equipment manufacturers.	Strong growth predicted for mini-labs and emerging color copier industry
Matala	Black and white chemical systems; phototypesetting paper	Commercial printing and publishing industry	Sales of rapid access chemical systems increased during 1987. Private labeling black and white chemical systems to major accounts further expanded our market.	Potential for new powdered chemical systems, introduction during 1988 with continued private labeling penetration.
Metals	Commercial alloy sheet and strip; copper, brass, leaded brass, tin brass, phosphor bronze, cupronickel, and nickel silver	Automotive, builders hardware, communications, electrical and electronic components, fasteners, holloware, musical instruments, stampings	Overall market penetration increased substantially during 1987. Demand in most segments was above 1986 levels.	Currency exchange rates, trade legislation, GNP.
	High performance copper alloy strip	Electrical, electronic, communications, automotive	Market penetration increased in the electronic and automotive connector segments. Shipments were at record levels.	Electronics technology, acceptance of Olin alloys.
	Posit-Bond clad and cupronickel coinage metal, strip and coin blanks	The U.S. and foreign mints	Demand for U.S. Mint coinage improved in 1987. Clad metal coin blanks were supplied to the Royal Thai Mint.	U.S. Mint policy and exchange rates.
	Drawn, stamped, blanked, cold headed and otherwise fabricated parts	Transportation, household products, military, medallions, electrical, builders hardware	The fabricated parts business improved over 1986. Commercial ammunition cupping market also improved.	Auto production, housing starts, military requirements.
	Fineweld copper alloy tube	Utility and industrial heat exchangers, air-conditioning, desalting, decorative hardware	Shipments and market share of copper alloy tube exceeded any previous year by a substantial margin.	Electric utilities new construction and overhauls, housing starts.
·	Specialty clad metals and <i>Polygage</i> strip	Electrical and electronic components, communications, automotive	Market penetration in clad metals increased and Polygage shipments to automotive remained good.	Electronics and automotive demand.
Interconnect Materials	Printed circuit copper, thin gauge copper, copper alloy, and stainless steel strip	Communications, electrical and electronic precision stamping, automotive	Assisted by a significant increase in stainless steel sales and the introduction of CopperBond, Somers operated at capacity.	Electronics, communications, and automotive demand.
Interconnect Materials	Ceramic substrates and laser services; custom multilayer ceramic packages	Hybrid, semiconductor and systems manufacturers in computers, defense/ aerospace, telecommunications, medical, automotive	Joint venture with Asahi Glass was established; products and services qualified with major U.S. customers for semi-custom/custom applications.	Emphasis on laser services and expansion into multilayer ceramic products.
	Hybrid metal packages	Hybrid circuits for defense/aerospace, telecommunications, medical	Completed the acquisition of Aegis, a leading supplier of these products in the U.S.	Hybrid circuit production. Expansion into multilayer ceramic products.
Defense	Tape Automated Bonding (TAB) tape and materials; contract integrated circuit assembly	Semiconductor and systems manufacturers	Organized industry effort to establish TAB standards; U.S. market leader in contract assembly. Established contract assembly capability in Mexico to target high volume segment of U.S. market. Established TAB contract assembly capability.	Speed at which the U.S. electronics industry adopts TAB. Growth of ASI devices. Growth of TAB products.
DG1G119G	Small and medium caliber ammunition, <i>Ball Powder</i> , jet engine starter cartridges, gas generators, combustible cartridge cases, rocket engines, advanced military warheads, pulsed power systems for nuclear radiation simulation, sophisticated engineering development and software, electronic components for aviation; operates government-owned arsenals.	Defense/Aerospace	Sales of medium caliber ammunition were strong. Ball Powder sales were down due to government inventory reduction programs. Fees earned for the operation of the Lake City Army Ammunition Plant were better than prior year.	Favorable government defense spending level and procurement priorities; development of new tactical weapons; competitive actions by importers; raw materials costs, principally metals.
	Winchester shotshells, rimfire and centerfire ammunition, canister			

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#### Chemicals



"Bowater's 28-year customer relationship with Olin Chemicals is based on Olin's dedication to remain knowledgeable of our needs and responsive to technological and market influences, while consistently delivering high quality products. Olin is our supplier because they meet our stringent requirements."

William A. Tuck
Director, Purchasing
Bowater Incorporated,
the largest U.S. manufacturer of
newsprint and a major producer of
other pulp and paper products.



"As aleading semiconductor manufacturer; Micron Technology considers consistent quality to be paramount in all aspects of the operation. Olin Hunt process chemicals are a very reliable part of our production process."

Brenda Stöddard Quality Team Program Manager MICRON TECHNOLOGY, INC. Boise; Idaho Olin's chemical businesses continued their profit improvement in 1987. Key factors contributing to this performance were productivity, cost reduction, timely new capacity and a continued emphasis on "close to the customer" programs. Significant contributions also came from the improved market for chlor-alkali products and the restructuring of the organic chemicals business. A turnaround to profitable performance of Olin Hunt Specialty Products was characterized by particularly good photoresist, toner and photographic business performance.

Substantial savings were achieved by restructuring feedstock production systems and product mix at the Doe Run, Ky., organic chemicals plant. Technical resources were focused on specialty surfactants and functional fluids to increase market share in these higher value added areas. The debottlenecking of the toluene diisocyanate (TDI) plant at Lake Charles, La., completed in the second quarter, brought total TDI capacity up to nearly 200 million pounds. A tight market led to increased prices and resulted in significant profit growth for the urethanes business.

Increased industry operating rates and tight supply/demand allowed for long-awaited price improvement in chlorine and caustic; and similarly, improved demand for sodium chlorate led to increased revenue. The pulp and paper industry, electrochemicals' largest market segment, had a banner year through which Olin benefited from key customer relationships. Successful entry into potassium hydroxide products provided more revenue growth, as well. In December, the Niachlor chlor-alkali plant located in Niagara Falls, N.Y., began production. This facility, a partnership with DuPont, operates on low cost hydroelectric power and modern membrane cell technology, assuring Olin of a low cost position in this market. Successful development of a new cell processing system for *Reductone* (sodium hydrosulfite) offers new potential for low cost production of this product. Improved profit performance for the entire electrochemicals business is anticipated in 1988.

The trend toward liquid detergent products for household use reduced demand for phosphate and industrial isocyanurates, negatively affecting the results for these product lines. A strong, coordinated marketing effort for the integrated Cleaning Products and Services business has allowed Olin to develop new applications and mitigate volume loss. The addition of specialty surfactants into this specialized marketing program has had positive results. Olin's sulfuric acid business had another excellent year, with record profits.

An automotive thrust has been developed within Olin's specialty urethanes business to capitalize on the company's technology and that of our Japanese joint venture, Asahi-Olin. Applications are for padded instrument panels, other interior trim, and seating for U.S. automobile manufacturers and original equipment manufacturers supplying Japanese companies assembling in the U.S. *Uralloy*, Olin's profiling additive for sheet molding compounds used in exterior automotive parts, is being marketed by this customer-oriented unit.

The hydrazine solutions business increased international volume and expanded domestically through innovative marketing for boiler treatment and other applications. The defense-related hydrazine propellant business received a government contract for blending and storage of A-50, the propellant for the Titan Launch Vehicle.



'IBM Brazil is an extremely quality conscious company with sales of about one billion U.S. dollars. IBM was one of Olin's first customers for Autopak, a foam packaging material that helps prevent damage to computer equipment in transit. IBM Brazil considers Olin Brazil a qualified justin-time supplier whose product and service quality clearly justified the annual Distinguished Supplier Award presented to Olin during IBM Brazil's Fourth National Suppliers Meeting."

Renata Neves
Purchasing Manager
IBM Brazil

The pool chemical business recorded improved earnings, regaining market position for chlorinated isocyanurates, with a continued solid performance by the *HTH* product line. A new line of pool maintenance and accessory items, utilizing the *HTH* brand name, contributed to maintaining *HTH*'s number one position. Productivity and quality improvements continued to favorably impact the business. International market development efforts resulted in increased pool chemical sales, offering several investment opportunities. This increased market penetration led to the acquisition of 35 percent of Hydrochim, an isocyanurate repacker located in France. Olin has the option to acquire the balance of the company, further enhancing its European pool chemical position. The challenge to Olin's 1985 purchase of FMC's pool sanitizer business has been upheld by the administrative law judge hearing the case. Olin has appealed this ruling for review by the Federal Trade Commission. Olin continues to believe it has a very good case for retaining these assets.

Olin Hunt had solid sales growth in the major markets it serves: photofinishing and graphic arts; semiconductor manufacturing; and office copiers and non-impact printers. In the photographics business, where Olin Hunt is a major supplier of photofinishing chemicals, color paper products, and black and white chemistry, sales showed a sizeable worldwide increase. Business with mini-labs, small retail operations which offer one hour photo processing, continued its rapid expansion. Color paper sales were strong, with custom cut sheet paper further expanding our professional photofinishing customer base.

Two major product families were introduced to the semiconductor market—a line of safer solvent photoresists (500 Series) and application-specific photoresists (ASPR). Close collaboration with individual customers to solve integrated circuit manufacturing challenges on a custom basis is the foundation of these product families. Microelectronic's process chemical business realized expanded market acceptance of the Semiconductor and Certified Particle Grade line of acids and solvents. Olin Hunt acquired Image Technology Corp. of Tempe, Ariz., an innovative manufacturer of specialty etchants, supplementing our Nazareth, Pa., plant. Dopants and related equipment sales expanded through increased market penetration and new products. Strong interactions with original equipment manufacturers will insure high future growth. New product introductions, a solid commitment to customer service and expansion of our distributor network were the focus of the printed wire board business, particularly the etchant product line. Commercialization of our new Blackhole technology, an innovative through-hole plating system, is expected in 1988. Sales of polymer thick film and related conductive materials grew substantially as Olin Hunt penetrated new markets. Sales of toners, developers and ink jet fluids in the electrostatics business increased over 1986. While most sales improvement came from existing products, strong research and development commitment is paving the way for substantial contributions from new products in 1988 and 1989. Applications for high speed computer copiers will be one of the fastest growing business opportunities.

During 1988 Olin Hunt operations are being consolidated into the Chemicals Group. Greater efficiencies and resource utilization, particularly within the manufacturing, technical and financial functions, should contribute to a lower breakeven and a strong 1988 chemicals performance.

"For thirty years, Olin's Metals Research Laboratories in New Haven, Conn., have supported our customers' ever-changing needs through leadership in process technology and new alloy introductions. Pictured here is a leadframe etched from one of Olin's newer materials, Alloy 7025, which meets the microelectronic industry's most stringent performance requirements."

tronic industry's most stringent performance requirements." Derek E. Tyler, Vice President, Metals Research Laboratories Sagnani Opaciing linenita (Saddos) Pageoudged



"It is the mission of The Intec Group to be competitive worldwide in marketing its component manufacturing capability. In order to achieve this goal, we needed a world class supplier of fabricated metal products. In Olin, Intec has found a true partner who offers the most advanced technological know-how, service and support available—in a word, value."

Gary C. White
Vice President of Operations
Permonite Division of The Intec Group,
a Morocco, Ind., custom insert molder.



Threlinson Technology is the world's leading supplier of suspension assemblies for the objid disk drive market in method in highlisposition, we made would deass supplier of predstands table allowed to the object of leaves of the object of t

Olin strengthened its leadership position in the metals business by expanding market share for the second consecutive year. This was accomplished in a market that showed only moderate growth in 1986 and 1987. The increase in market share resulted in full capacity operations for most of the year. Performance was enhanced as a result of aggressive service and quality programs. These programs enabled Olin to take advantage of the upturn in the electronics market as well as developing opportunities in the automotive and housing markets.

The Metals Research Laboratories (MRL) in New Haven, Conn., marked 30 years of service. MRL is the recognized world leader in copper alloy research and development. During this span of time over 550 patents, including 31 in 1987, covering new materials, products and improved processes, were issued to meet the needs of an ever changing market.

High performance alloy sales were at record levels. Favorable market acceptance of three new high performance alloys, C197, C7025 and C724, has been rewarding. All three alloys are now being sold in production quantities. Olin-developed alloys such as these provide unique properties for today's market.

Somers Thin Strip introduced *CopperBond* foil to the printed circuit industry early in 1987. Somers, long recognized as the leading domestic supplier of wrought copper foil for flexible and microwave circuits, added surface treatment capability to broaden and strengthen its market position.

Developed by MRL, *CopperBond* offers the printed circuit industry the only source for treated copper foil that is produced completely by one company, providing customers with a reliable supply of product. Customer acceptance has been good, leading to a significant domestic market share in the first year of sales. Marketing efforts have already extended beyond U.S. borders with initial orders received from both Europe and the Far East.

The *Fineweld* Tube operation experienced its largest single-year gain in volume and market share, with both at record levels. A concentrated effort in the commercial portion of the market yielded most of the increase as the industrial market, primarily electric utilities, was up only slightly.

Olin's specialty metals operation made significant strides during 1987, and is well positioned heading into 1988. This was accomplished by expanding capabilities while also developing a more focused approach to the clad and inlay metals market. Key customer negotiations were successfully concluded at year end, allowing Olin to improve its position.

The purchase of the fabricated metals operation of Revere Copper and Brass was completed in November. This Bloomington, Ill., operation, now called Olin Fabricated Metal Products (FMP), produces metal stampings from copper and copper alloys, as well as stainless steel, aluminum, and carbon steels. FMP is a major defense supplier of copper shaped charge liners for the U.S. Government. Its other products span a wide range of commercial applications. The fit with Olin is excellent, and we expect this business to be an important contributor in the future.

Imports of copper alloys decreased again in 1987 and are off 30 percent from their highs of 1984. We believe the changes in the monetary exchange rates and the trade proceedings brought by the Copper and Brass Fabricators Council are responsible for the reversal.



"Our six year old operation has experienced an average annual growth rate of forty percent. Olin has been with us from the beginning, first with research and technical support and then with on-time delivery of high quality clad metal products. Olin has given us the service we require."

Thomas D. Coe, President

QA Technology Company, Inc., a

Hampton, N.H., maker of test probes
for automatic test equipment for the
electronics industry.

International participation was substantially expanded in 1987 with the formation of the Brass Group's first manufacturing/marketing joint venture in Japan. This new partnership with Yamaha's Metal Division, a highly specialized metals producer with emphasis on electronic applications, commenced product sales in September. Joint venture options for Europe and Latin America are under study, further supporting efforts to make Olin high performance alloys available worldwide and to broaden the Group's international presence.

To support growing customer requirements, plans are in place to expand capacity and broaden capabilities. These objectives will be accomplished through the addition of state-of-the-art rolling, annealing, and slitting equipment. This equipment package will be added in stages beginning in mid-1988, with scheduled completion by early 1989.

### **Interconnect Materials**

This was the first full year of operations for Olin's interconnect businesses, which serve microelectronic customers with a broad spectrum of technologies and products designed to meet a variety of needs associated with high performance semiconductors and hybrid circuits for the aerospace, defense, medical, telecommunication and computer industries.

Several new products were marketed to customers in 1987: a proprietary copper alloy packaging system low temperature and high temperature multilayer ceramics, and laser trimmed and cut ceramic substrates. In addition, the introduction of the *Accustrates* family of ceramic substrates continued.

The acquisition of Aegis, Inc., a leading producer of metal packages for semiconductors, by Olin's joint venture with Asahi Glass Company, is a key building block for Olin's worldwide microelectronic business and represents a forward integration into higher value-added products. The Aegis manufacturing facility is presently being expanded to 100,000 square feet at its New Bedford, Mass., headquarters.

Mesa Technology, Olin's entry into the tape automated bonding (TAB) materials business, organized an industrial user group to establish material, design, and handling standards for TAB products that will be used in connecting the most sophisticated integrated circuits to other electronic components. Mesa's manufacturing capacity in Mountain View, Calif., was expanded during the year to meet increased product demand.

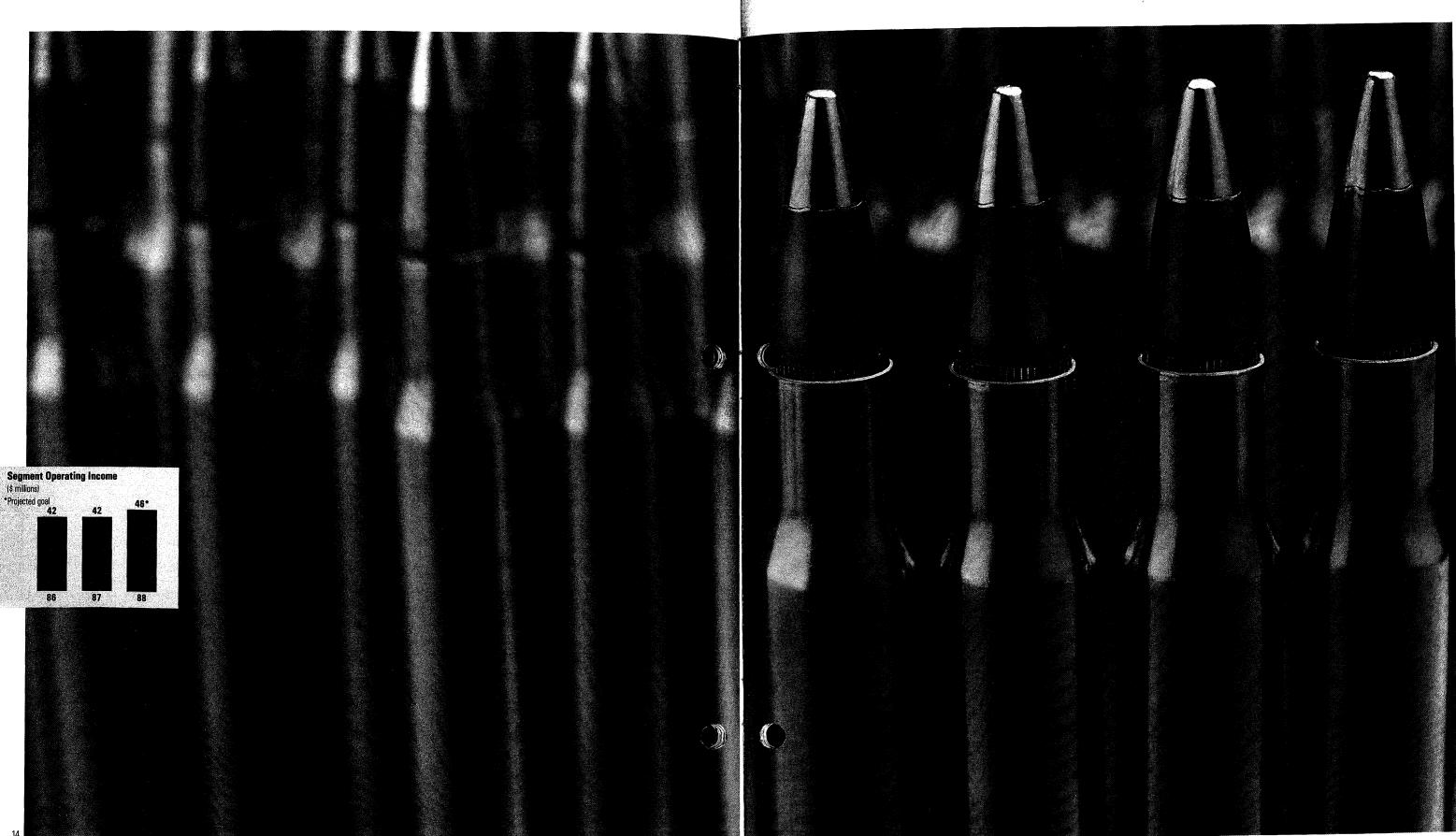
Indy Electronics (45% Olin-owned) experienced a resurgence in integrated circuit assembly in the United States, with significantly increased sales. In September, Indy brought on line a new IC assembly plant in Tijuana, Mexico, which will enable Indy to compete with the Asian assembly plants where labor costs are significantly lower than in the U.S. In December, Indy's assembly plant in Scotland was sold to its management. Due to market conditions and the nature of the European semiconductor market, we concluded that the Scotland plant would not reach the full potential we had previously projected.

Overall, Olin's interconnect businesses experienced a year in which key technologies were brought together for maximum benefit of our customers.

antiMarosatilore

"Winchester's support of my retail ammunition business is truly exceptional. Winchester provides me with not only innovative promotions that build in-store traffic, but also with top-notch technical materials designed to help the hunter and shooter become more successful."

Joe McBride, Sr., McBride's Guns, Inc., Austin, Texas



#### **Ammunition and Defense-Related Products**



"Since the F-16 aircraft entered service with our armed forces in 1979, Olin's Pacific Electro Dynamics unit has been a supplier of on-board power supplies and electronic ground support testing equipment, both key elements of this successful program."

Wayne K. Maddox Manager, Logistics General Dynamics Fort Worth, Texas



"Quality is essential to our nation's defense programs. For the second consecutive year Olin's Ordnance Division has been given Texas Instruments' Supplier Excellence Award. Olin is one of a select few suppliers whose performance in the areas of quality, delivery and overall support is considered outstanding."

Jack E. Swindle
Vice President, Defense Systems
Texas Instruments
Dallas, Texas

In its first full year of operation, the Defense Systems Group made significant progress in achieving Olin's longterm objectives in the defense and aerospace businesses.

A small initial production facility at Olin's St. Marks, Fla., powder operations was successfully qualified as the Army's second domestic source for 120mm combustible cartridge cases for tank ammunition. Contracts for an expanded combustible cartridge case production facility have been negotiated and should be finalized early in 1988. Completion of this facility in 1990 will position Olin to become a major producer in a sizeable combustible products market that includes tank, howitzer, and mortar ammunition.

Olin is in competition for the U.S. Army's 120mm Mortar Program, which involves both ammunition development and production contracts. The Olin Ordnance Division has also developed a systems concept for an advanced, armored mobile mortar system. Olin's concept, Forward Armored Mortar System (FAMS), has been extensively studied within the Army and has been favorably received. The opportunity exists to secure funding for systems development and proof-of-principle studies. The Ordnance Division's participation in these advanced programs is part of an overall strategy to advance Olin's position in the Large Caliber Systems market.

Sales of *Ball Powder* propellant, produced at the St. Marks facility, were reduced primarily due to the U.S. Army's inventory reduction program; however, capital investment and process improvements generated higher yields and better profits. Olin successfully developed propellant for use in 81mm and 120mm mortar ammunition and was awarded an Army contract to adapt *Ball Powder* propellant for use in large caliber tank ammunition.

Sales of medium caliber ammunition produced at the Marion, III., facility exceeded prior year levels by 50 percent. A three year production contract valued at \$60 million for 20mm Phalanx anti-missile ammunition was received late in the year. This Navy contract was the largest ever awarded to the Ordnance Division.

Small caliber ammunition research and development efforts are being concentrated on new advanced ammunition such as .50 caliber and 7.62mm saboted armor penetrating ammunition, advanced rifle system ammunition and new training ammunition for low cost, short range applications.

Rocket Research Company made significant progress on the Small Intercontinental Ballistic Missile (SICBM) Rocket Engine Module. These rocket modules, which provide precise maneuvering and targeting of the SICBM re-entry vehicle, were subjected to qualification testing late in the year. As a result of the company's performance on the SICBM program, as well as a number of previous efforts, Martin Marietta has committed to procure units similar in design to the SICBM modules for their commercial and government Titan Expendable Launch Vehicle programs.

Physics International received a production contract to manufacture an entire shaped charge warhead system. This system is designed to provide increased armor penetration to the Dragon anti-tank missile developed for the U.S. Marine Corps. This is the first production contract for a Physics International developed warhead system; the system will be produced at Olin and government-owned facilities in Wadsworth and Ravenna, Ohio. To support shaped charge warhead development programs, Physics International recently con-



"Spacecraft systems' performance is of critical importance due to the high cost of placing spacecraft in orbit. As a result of Olin's Rocket Research Company's continuing thruster technology and performance enhancement initiatives, we have been able to beneficially increase satellite on-orbit lifetimes. Our experience has been that Rocket Research continually strives to improve its product."

Ricardo deBastos
Vice President
RCA Astro Space Division of
General Electric Co.
Princeton, N.J.

structed a 330-foot rocket sled track at its Tracy, Calif., Test Facility. This rocket sled is unique in the ordnance industry and will be used to conduct dynamic warhead impact tests.

With the tragic loss of the Space Shuttle Challenger, Rocket Research's sales of Auxiliary Power Unit (APU) gas generators have decreased substantially. The delay, however, has enabled Rocket Research to demonstrate, under NASA sponsorship, a long-life gas generator which will enable Space Shuttles to fly missions without replacement of the APU. This technology advancement holds promise for increased sales of the improved units as the Shuttle resumes service.

Rocket Research and Physics International combined their expertise in the development of a rifle-launched, rocket assisted anti-armor system for the Department of Defense. Tests of this weapon system have demonstrated a high degree of reliability and accuracy. Additional contracts for development work on this project are being aggressively pursued for 1988.

Working closely with the Defense Nuclear Agency, Physics International has developed a Fast Electromagnetic Pulse Simulator, which will provide the advanced testing technology necessary to harden strategic systems.

Pacific Electro Dynamics experienced record sales as well as record levels of new business acquired during the year. Demand for PED's primary product, digital programmers for stores management testers and power supplies/power conditioners, remains strong. Future planned research and development in these and other areas should allow PED to continue its growth.

Olin's *Winchester* sporting ammunition maintained its leadership position in the commercial markets. Aggressive marketing combined with responsive product availability and customer service resulted in record sales in 1987. The non-toxic *Super Steel* shotshell line was expanded to 38 different loads, the most complete in the industry. *Super-Lite AA* target loads continue to gain acceptance among competitive shooters, evidenced by the dramatic increase in usage among professional shooters at the Grand American Trap Shoot and the World Skeet Shoot. The introduction of the *Super X Silvertip Boattail* .30-06 caliber ammunition was well received by hunting enthusiasts. This round was the forerunner of a new *Supreme* line of sporting ammunition, developed with defense analytical technology, to meet growing consumer demands for improved accuracy and performance. This new line was successfully introduced in January, 1988. In response to customer needs, Winchester developed an electronic data interchange system which allows customers to place and monitor their orders directly through a computer network system.

In February, after just one year under Olin's management, the Lake City Army Ammunition Plant in Independence, Mo., was awarded one of the higher performance ratings possible by the U.S. Government. The same high standards of production, quality, cost and management continued through the second contract year, which ended October 31. All production schedules for the year were met, and at less cost to the government than was anticipated in the contract.

Olin's Defense Systems Group is meeting the challenges of today's aerospace, defense and commercial markets through its commitment to technological research, service, quality and cost effectiveness.

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# **Results of Continuing Operations**

# 1987 Compared with 1986

Revenues (Net Sales and Operating Revenues) were \$1,930 million, an increase of \$198 million, or 11% over revenues in 1986. Operating income was \$149 million compared with \$106 million in 1986. The increase in revenues was the result of strong product demand and a modest increase in product prices. These improvements coupled with a better product mix, continuing efforts at cost reductions and the favorable impact of the dollar on international profitability were the contributing factors to a 41% increase in operating income. Results by industry segment are reviewed below.

Metal Products revenues and income increased 25% and 22%, respectively, compared with the prior year. The significant increase in revenues is attributable to strong product demand, especially in the areas of automotive, electronics and electrical applications and the pass-through of an escalation in copper prices. Reasons for the volume gains were improved market demand and the impact of a declining dollar on imports. Profitability improved accordingly, aided by an increase in product prices and a more favorable product mix.

**Chemical Products** revenues increased 9% over the prior year as a result of an increase in volume and a more favorable product mix. Segment operating income was up 34% over the comparable period. Industrial chemicals had strong product demand in chlor-alkali throughout the year and during the second half there was a strengthening in product pricing. Pool chemical demand was strong for the year but profits were only slightly ahead due to a softening of prices in the isocyanurate market. Performance chemicals showed a significant improvement in both revenues and profits, led by strong demand for urethane chemicals and the continued weakening of the U.S. dollar. Olin Hunt Specialty Products performance showed a substantial improvement over the prior year.

**Ammunition and Defense-Related Products** revenues were up 9% primarily due to strong revenues in sporting ammunition and advanced defense and aerospace products. Segment operating income was comparable with the results of the prior year. The revenue improvement in sporting ammunition and improved performance in operating the government-owned Lake City Army Ammunition Plant were not sufficient to offset the impact of lower small caliber ammunition revenues and a significant increase in the price of commodity metals—copper and lead.

Other Financial Data—Cost of sales and other charges decreased from 76% of revenues in 1986 to 75% of revenues in 1987 due to continuing emphasis on manufacturing productivity programs. Selling, general and administrative expenses also decreased to 13.7% of revenues in 1987 compared with 14.5% for the prior year as a result of the company's continuing cost reduction efforts. Expenditures for research and development, while up 11% over 1986, were comparable with the prior year as a percentage of revenues. Interest expense was comparable to 1986. Interest and other income trailed 1986 substantially, which benefited primarily from significant nonrecurring gains from land sales and the availability of more funds for investment at higher interest rates.

#### 1986 Compared with 1985

Revenues for 1986 were \$1,732 million, a decrease of \$28 million, or 2% from 1985. Operating income was \$106 million compared with a loss of \$265 million in 1985. The 1985 results included a special charge of \$330 million as part of a major restructuring program (Metal Products \$2 million, Chemical Products \$264 million, Ammunition and Defense-Related Products \$38 million and Other Products \$26 million). Overall, the revenues decline resulted from exiting businesses as part of the company's restructuring program. Excluding revenues from the exited businesses, revenues increased slightly despite an average decline of 3% in selling prices. Excluding the special charge in 1985, segment operating income improved due to the change in product mix resulting from the restructuring program, continued gains in productivity leading to reduced manufacturing costs and operating expenses, weakening of the U.S. dollar which contributed to healthy gains in international profitability and the adoption of Statement of Financial Accounting Standards (SFAS) No. 87, "Employers' Accounting for Pensions." Changes from the prior year exclusive of the 1985 special charge are reviewed in the following paragraphs.

**Metal Products** revenues and income increased 5% and 38%, respectively, compared with the prior year. The modest revenue increase is a reflection of increased volume of commercial products and high performance alloys for the electronics industry, offset by a decline in selling prices due to increased competitiveness in the market place. Profitability increased significantly due to increased operating utilization, better cost performance, a decline in energy costs and a more favorable product mix.

**Chemical Products** revenues declined 2% from the prior year as product pricing continued to be highly competitive. Segment operating income was up 76% over the comparable period. Industrial chemicals continued to experience a softening in selling prices which was more than offset by improved cost performances and benefits resulting from implementation of the restructuring program. Pool chemical revenues were strong and combined with the benefits of manufacturing cost reductions, the declining value of the U.S. dollar and an improved product mix contributed significantly to the segment

operating income improvement. Performance chemicals also showed strong improvement as a result of improved cost performance and a weakening of the U.S. dollar. Olin Hunt Specialty Products performance was comparable with the prior year.

Ammunition and Defense-Related Products revenues were up 18% primarily due to the operations of Rockcor, Inc., acquired in April 1985, and strong sporting ammunition revenues. Segment operating income was up 68% compared with the prior year. The increase was primarily attributable to operating the government-owned Lake City Army Ammunition Plant for a full year and improvements in the *Ball Powder*, pulsed power and military electronics products businesses.

**Other Products**—The Ramset business was sold in the first quarter of 1986. In June 1986, Olin Ski Company and Trak Inc. formed a joint venture called TriStar Sports Inc., in which the company maintains a 50% interest. The company is continuing its efforts to sell the Signal Products business. The assets of this operation, which are not material, are included in the Chemical Products segment.

Other Financial Data—Cost of sales and other charges decreased from 79% of revenues in 1985 to 76% of revenues in 1986 due to manufacturing cost reduction programs, the change in accounting for pension costs, and lower raw material and energy costs. Selling, general and administrative expenses, also favorably impacted by the change in accounting for pension costs, were comparable with the prior year while expenditures for research and development increased approximately 4%. Interest expense vas lower than 1985 due to lower average borrowings and lower interest rates. Interest and other income increased in 1986 primarily as a result of nonrecurring land sales.

#### **Liquidity and Investment Activities**

Net cash flows from operating activities amounted to \$206 million in 1987 compared with \$173 million and \$97 million in 1986 and 1985, respectively. In 1987, the company used cash generated from operations, proceeds from the sales of businesses and additional borrowings to finance capital and investment spending of \$184 million and stock repurchases of \$100 million. In addition to the businesses acquired, investment spending included \$33 million for Niachlor, a partnership with DuPont for the construction of a chlor-alkali plant which began operation in the fourth quarter of 1987. It is anticipated that operations will continue to provide cash for normal working capital requirements, capital expenditures, continuation of the restructuring program and completion of the company's 5,000,000 share common stock repurchase program.

The company repurchased 2,033,100 shares of stock under this program during 1987 and an additional 241,400 shares upon termination of the company's Pay Related Stock Ownership Plan. In January 1987, prior to the redemption date set by the Board of Directors, substantially all of the company's 83/4% debentures outstanding at December 31, 1986 were converted into approximately 2,700,000 common shares. The conversion was the dominant factor giving rise to the increase in shares outstanding at December 31, 1987.

In September 1985, the company recorded a pretax charge of \$330 million (\$230) million after tax) as part of a major restructuring program. Actions identified by the program included: selling or liquidating certain businesses; decommissioning stand-by chemical facilities; writing down certain facilities and assets permanently impaired by changed worldwide economic conditions; ensuring environmental safety at decommissioned facilities and former disposal sites; and reducing staff and consolidating administrative functions. At December 31, 1987, \$95 million remain accrued for business dispositions, plant closures and environmental costs. During 1987, the balance was increased by \$38 million of recoveries under insurance claims and \$9 million of net gain from the disposition of businesses. The balance was decreased by expenditures of \$40 million provided for under the program.

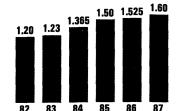
#### **Financial Position**

The company's financial position remained strong at December 31, 1987. The ratio of total debt to total capitalization was 38.7% and the current ratio was 1.7 to 1. Accounts receivable collection period and inventory turnover remained good. At December 31, 1987 cash and cash equivalents aggregated \$34 million; notes payable associated with foreign operations, amounted to \$26 million; and working capital was \$276 million.

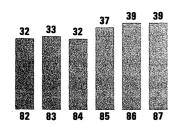
Consistent with recent trends in liability insurance, the company experienced a substantial decrease in liability coverage in 1986. This situation reflected the insurance market's position generally and was not unique to Olin. During 1987, the availability of liability insurance at a reasonable cost was again very limited and the company continued to operate without the amount of coverage maintained prior to 1986.

In late 1987, the Financial Accounting Standards Board issued two new statements of financial accounting standards which the company will not adopt until future periods. The adoption of SFAS No. 94, "Consolidation of All Majority Owned Subsidiaries," will not have a material effect on the company's financial position. The financial statement impact of adopting SFAS No. 96, "Accounting for Income Taxes," will depend on tax rates and other tax measures in effect at the date of adoption.

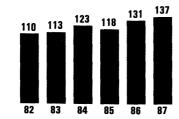
Dividends Paid (\$ per share)



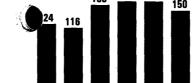
# **Total Debt/Total Capitalization**



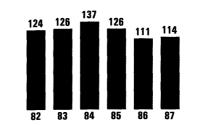
# Revenues per Employee



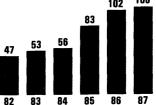
# **Capital Expenditures (Including Joint Venture Plant Investments)**



# Depreciation



# Research and Development (Including Customer Sponsored)



# **Industry Segments**

(Dollars in millions, except per share amounts)	1987	1986	1985	1984	1983	1982
Operations					-	
let Sales and Operating Revenues	\$1,930	\$1,732	\$1,760	\$1,816	\$1,706	\$1,570
ost of Sales and Other Charges	1,455	1,318	1,389	1,396	1,320	1,239
pecial Charges	_	_	330	_	_	19
elling, General and Administrative	264	252	252	256	247	- 221
Research and Development	62	56	54	52	49	45
Operating Income (Loss)	149	106	(265)	112	90	46
nterest Expense	. 32	32	35	34	31	30
nterest and Other Income	10	41	- 18	25	14	. 14
Income (Loss) Before Income Taxes	127	115	(282)	103	73	30
ncome Taxes (Benefits)	49	40	(92)	29	13	• (9
ncome (Loss) From Continuing Operations	78	75	(190)	74	60	39
Discontinued Operations, Net of Taxes	_		25	74 15	12	14
Net Income (Loss)	78	75	(165)	89	72	53
A SECTION OF THE CONTRACT OF T			(100)		. 12	
Financial Position Cash and Cash Equivalents	34	9	48	155	192	תר
casn and cash equivalents Receivables, Net	3 <del>4</del> 362	321	324	287	192 290	79 299
nventories	273	264	32 <del>4</del> 267	261	238	299 236
Current Liabilities	404	391	391	388	236 396	368
Norking Capital—Net	276	210	304	367	372	
Property, Plant and Equipment, Net	727	720	718	796	372 788	288
Toperty, Flant and Equipment, Net Total Assets	1,685	1,545	1,598	1,793		777
Capitalization:	1,000	1,040	1,050	1,/30	1,803	1,613
Total Debt	442	427	401	414	427	381
Shareholders' Equity	700	654	687	867	848	805
Total Capitalization	1,142	1,081	1,088	1,281	1,275	1,186
Per Share Data				***************************************	·	
Net Income (Loss):						
Primary:						
Continuing Operations	3.38	3.36	(8.28)	3.15	2.50	1.64
Discontinued Operations	_		1.09	.66	.51	.62
Net Income (Loss)	3.38	3.36	(7.19)	3.81	3.01	2.26
Assuming Full Dilution:			(,,,,,			
Continuing Operations	3.32	3.13	(8.28)	2.96	2.42	1.00
Discontinued Operations	J.JZ	, 0.10 —	1.09	.58	2.43 .48	1.62 .61
Net Income (Loss)	3.32	3.13				
AND THE PROPERTY OF THE PROPER			(7.19)	3.54	2.91	2.23
Cash Dividends Shareholders' Equity	1.60	1.525	1.50	1.365	1.23	1.20
	31.81	30.56	29.89	37.88	35.37	34.06
Other .		111	400	407		
Depreciation Net Cash Flows From Operating Activities	114	111	126	137	126	124
net Gash Flows From Operating Activities Cash Dividends	206	173	97	210	301	150
astr Dividends Sapital Expenditures	37 115	34	35 454	32	29	28
apital Expenditules Surrent Ratio	115	128	154	155	115	124
oral Debt to Total Capitalization	1.7	1.5	1.8	1.9	1.9	1.8
otar Deol (10 (10tal Capitalization Return (on Ending Equity	38.7%	39.5%	36.9%	32.3%	33.5%	32.1
AND CONTRACTOR OF THE PROPERTY	11.1%	11.5%	*	10.3%	8.5%	6.6
Shareholders	20,700	20,600	22,400	24,400	31,500	34,000
mployees	14,100	13,200	14,900	14,800	15,100	14,300

	(In millions)	Metals	Chemicals	Ammunition and Defense-Related	Other	Corporate and Other	Consolidated
1987	Net Sales and Operating Revenues Operating Income (Loss)	\$304 44	\$1,232 99	\$394 42	\$ — —	\$ — (36)	\$1,930 149
	Assets	223 13	924	373	_	165	1,685
	Capital Expenditures Depreciation	18	83 82	19 14	-	_	115 114
1986	Net Sales and Operating Revenues	\$244	\$1,127	\$361	\$ —	\$ -	\$1,732
	Operating Income (Loss)	36	74	42	_	(46)	106
	Assets	204	840	365	<u>—</u> ·	136	1,545
	Capital Expenditures	24	84	20	_	_	128
	Depreciation	17	83	11	<del>-</del> .	_	111
1985	Net Sales and Operating Revenues	\$232	\$1,153	\$307	\$ 68	\$ —	\$1,760
	Operating Income (Loss)	24	(222)	(13)	(22)	(32)	(265
	Assets	184	825	331	81	177	1,598
	Capital Expenditures	28	105	19	2	<del>.</del> .	154
	Depreciation	14	102	8	2	_	126
1984	Net Sales and Operating Revenues	\$291	\$1,191	\$225	\$ 96	\$ 13	\$1,816
	Operating Income (Loss)	55	61	20	7	(31)	112
	Assets	189	1,034	209	72	289	1,793
	Capital Expenditures	33	102	18	2	_	155
-	Depreciation	12	118	5	2	_	137
1983	Net Sales and Operating Revenues	\$261	\$1,132	\$207	\$ 95	\$ 11	\$1,706
	Operating Income (Loss)	33	67	22	(1)	(31)	90
	Assets	163	1,010	197	94	339	1,803
1	Capital Expenditures	18	78	16	3	<del>-</del>	115
	Depreciation	12	108	4	2	· –	126
1982	Net Sales and Operating Revenues	\$233	\$1,032	\$200	\$106	\$ (1)	\$1,570
	Operating Income (Loss)	21	26	34	(5)	(30)	46
	Assets	138	922	202	102	249	1,613
	Capital Expenditures	16	92	13	3		124
	Depreciation	11	107.	4	2	_	124

**Products** 

	1987	1986	1985	1984	1983	1982
Metals	\$24	\$20	\$23	\$22	\$16	\$14
Chemicals	1 .	1	1	1	1	1
Ammunition and Defense-Related	- ,	_	3	2	2	1
Other	_	_	_		_	1
	\$25	\$21	\$27	\$25	\$19	\$17
(2) Assets of Corporate and Other include the following:						
Investments in Affiliates	\$137	\$ 104	\$ 54	\$ 37	\$ 65	\$ 63
Discontinued Operations, Net	_	_	_	87	88	92
Other	28	32	123	165	186	94
	\$165	\$ 136	\$ 177	\$ 289	\$ 339	\$ 249

<sup>(3)</sup> The operating income of each industry segment represents net sales and operating revenues less cost of sales, special charges and other operating expenses. Operating income excludes income taxes, interest expense and interest and other income.

<sup>(4) 1985</sup> operations include a special charge of \$330, allocated to the various segments as follows: metal products \$2, chemical products \$264, ammunition and defense-related products \$38 and other products \$26. In 1982 operations include a special charge of \$19 related to chemical products.
(5) See Statement of Accounting Policies and Notes to Financial Statements for information relative to non-U.S. operations and change in accounting for pensions in 1986.

Consolidated Statements of Income	9
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December 31 (In millions, except share data)	1987	1986
Assets		
Current Assets:		
Cash and Cash Equivalents	\$ 34	\$ 9
Receivables, Less Allowance for Doubtful Items, \$15 (\$12 in 1986)		
Trade	312	267
Other	50	54
Inventories	273	264
Other Current Assets	11	7
Total Current Assets	680	601
Investments and Advances—Affiliated Companies, at Equity	137	104
Property, Plant and Equipment, Less Accumulated Depreciation, \$1,280 (\$1,192 in 1986)	727	720
Goodwill	102	80
Other Assets	39	40
Total Assets	\$1,685	\$1,545
Liabilities and Shareholders' Equity		
Current Liabilities:		
Notes Payable	\$ 26	\$ 38
Current Installments of Long-Term Debt	24	. 14
Accounts Payable	200	171
Income Taxes Payable	11	5,
Accrued Liabilities	143	163
Total Current Liabilities	404	391
Long-Term Senior Debt	267	277
Long-Term Subordinated Debt	125	98
Deferred Income Taxes	49	24
Other Noncurrent Liabilities	140	101
Total Liabilities	985	891
Shareholders' Equity:		
Preferred Stock, Par Value \$1 Per Share:		
Authorized, 10,000,000 Shares. Issued, None	_	
Common Stock, Par Value \$1 Per Share:		
Authorized, 60,000,000 Shares.		
Issued, 22,002,655 Shares (21,404,903 in 1986)	22	21
Additional Paid-In Capital	200	122
Cumulative Foreign Exchange Adjustment	4	1
Retained Earnings	474	510
Total Shareholders' Equity	700	654
Total Liabilities and Shareholders' Equity	\$1,685	\$1,545
The accompanying Contempor of Accounting D.E.		

The accompanying Statement of Accounting Policies and Notes to Financial Statements are an integral part of the financial statements.

Years ended December 31 (In millions, except per share amounts)	1987	1986	1985
Net Sales and Operating Revenues	\$1,930	\$1,732	\$1,760
Costs and Expenses:			
Cost of Sales and Other Charges	1,455	1,318	1,389
Special Charge	<del>-</del>	_	330
Selling, General and Administrative	264	252	252
Research and Development	62	56	54
Operating Income (Loss)	149	106	(265)
Interest Expense	32	32	35
Interest and Other Income	10	41	18
Income (Loss) Before Income Taxes	127	115	(282)
Income Taxes (Benefits)	49	40	(92)
Income (Loss) from Continuing Operations	78	75	(190)
Discontinued Operations, Net of Taxes:			
Income from Operations	<del>-</del>		6
Gain on Sale	_	_	19
Net Income (Loss)	\$ 78	\$ 75	\$ (165)
Net Income (Loss) Per Share:			
Primary:			
Continuing Operations	\$ 3.38	\$ 3.36	\$ (8.28)
Discontinued Operations	<b>-</b> ·	_	1.09
Net Income (Loss)	\$ 3.38	\$ 3.36	\$ (7.19)
Assuming Full Dilution:			
Continuing Operations	\$ 3.32	\$ 3.13	\$ (8.28)
Discontinued Operations	_	_	1.09
Net Income (Loss)	\$ 3.32	\$ 3.13	\$ (7.19)
The accompanion Castomers of Assessing Delicine and Nature to Financial Castomers are an interval	A CALL C. C. Laboratoria		

The accompanying Statement of Accounting Policies and Notes to Financial Statements are an integral part of the financial statements.

# **Consolidated Statements of Cash Flows**

	Common Stock		A dallata al	Cumulative		_
•	Shares	Par	Additional	Foreign	D	Treasury
(In millions, except share data)	Issued	Value	Paid-In Capital	Exchange Adjustment	Retained Earnings	Stock, At Cost
Balance at December 31, 1984	24,446,017	\$24	\$137	\$(22)	\$ 769	\$ 41
Net Loss	_	- YZ1	Ψ107 —	Y(ZZ)	(165)	\$ 41
Cash Dividends	_	_	_		(35)	_
Purchases of Stock (131,500 Shares)	_	_	_	_	(33)	 5
Stock Options Exercised (189,639 Shares)	_	_	(1)	_	_	
Translation Adjustment	_	_	<del>-</del>	20	_	(5)
Stock for Incentive Compensation Plans (13,425 Shares)	_	_		20	_	(1)
Other Transactions	(13)	_	_	_	_	- (1)
Balance at December 31, 1985	24,446,004	24	136	(2)	569	40
Net Income	· · · —	_	_		75	<del>-</del>
Cash Dividends	_	_			(34)	
Purchases and Retirement of Stock	(1,868,500)	(2)	(11)	_	(70)	_
Conversion of Convertible Debentures	45,928	_	_	_	-	_
Retirement of Treasury Stock(1)	(1,475,375)	(1)	(9)	_	(30)	(40)
Stock Options Exercised	164,150	_	4	_	-	1701
Translation Adjustment	· <del></del>	_	_	3	_	_
Stock for Incentive Compensation Plans	92,712	_	2	_	_	
Other Transactions	(16)	_	_	_		_
Balance at December 31, 1986	21,404,903	21	122	1	510	
Net Income	_	_	_	_	78	_
Cash Dividends	_	_	_	_	(37)	_
Purchases and Retirement of Stock	(2,291,608)	(2)	(21)	_	(77)	_
Conversion of Convertible Debentures	2,690,199	2	96	_	_	_
Stock Options Exercised	171,755	_	3	_	_	_
Translation Adjustment	_	_	_	3	_	_
Stock for Incentive Compensation Plans	27,416	1	_	_	_	_
Other Transactions	(10)	_	_	-	_	_
Balance at December 31, 1987	22,002,655	\$22	\$200	\$ 4	\$ 474	\$ -

(1) As a result of revisions to the Virginia Stock Corporation Act, the concept of treasury stock was eliminated effective January 1, 1986 for companies incorporated in the state of Virginia. In previous years, common shares purchased by the company were held in the treasury and continued to remain issued; in 1986 all treasury stock was retired and returned to authorized but unissued status. Following are the numbers of shares issued, in the treasury and outstanding at December 31.

	1987	1986	1985	1984
Issued Treasury Stock	22,002,655	21,404,903	24,446,004 (1,475,375)	24,446,017
Troubury Ottook			(1,4/0,0/0)	(1,546,939)
Outstanding	22,002,655	21,404,903	22,970,629	22,899,078

The accompanying Statement of Accounting Policies and Notes to Financial Statements are an integral part of the financial statements.

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(31)	_	(9:
19	46	11
(38)	(60)	(3)
6	(1)	(
(157)	(135)	(15
137	42	90
(15)	(19)	(11)
(12)	13	
(100)	(83)	(
3	4	
(37)	(34)	(3
(24)	(77)	(5
25	(39)	(10
9	48	15
	A 0	\$ 4
	(12) (100) 3 (37) (24) 25	(12) 13 (100) (83) 3 4 (37) (34) (24) (77) 25 (39)

The accompanying Statement of Accounting Policies and Notes to Financial Statements are an integral part of the financial statements.

# **Notes to Financial Statements**

(In millions, except share data)

#### **Basis of Presentation**

The consolidated financial statements include all significant subsidiaries. Investments in 20-50%-owned companies are carried at equity.

In 1987, operating revenues previously reported in interest and other income have been included in net sales and operating revenues. In addition, operating income of industry segments excludes interest and other income. Prior years' amounts have been reclassified to conform with the 1987 presentation.

In 1987, the company presents a statement of cash flows in accordance with the provisions of Statement of Financial Accounting Standards (SFAS) No. 95, "Statement of Cash Flows." Comparative financial statements of prior periods have been reclassified to conform with the 1987 presentation.

#### Inventories

Inventories are valued principally by the dollar value last-in, first-out (LIFO) method of inventory accounting.

# **Property, Plant and Equipment**

Depreciation is computed on a straight-line basis over the estimated useful lives of the related assets. Leasehold improvements are amortized over the term of the lease or the estimated useful life of the improvement, whichever is less. Start-up costs are expensed as incurred.

#### **Federal Income Taxes**

Deferred taxes are provided for significant timing differences. Deferred taxes have not been provided on the undistributed earnings of certain foreign subsidiaries, since the company intends to continue to reinvest these earnings. Investment tax credits are recorded on the flow-through method.

# **Foreign Currency Translation**

Foreign affiliates balance sheet accounts are translated at the exchange rates in effect at year end, and income statement accounts are translated at the average rates of exchange prevailing during the year. Translation adjustments are recorded as a separate component of shareholders' equity. Foreign currency exchange losses, net of taxes, were \$1 million, \$1 million and \$2 million in 1987, 1986 and 1985, respectively.

#### Goodwill

The excess of the purchase price paid over the net assets of businesses acquired is amor- The company maintains lines of credit with banks in which operating balances are tized principally over 30 years on a straight-line basis.

#### **Pension Plans**

Effective January 1, 1986, the company adopted for its domestic plans the provisions of SFAS No. 87, "Employers' Accounting for Pensions." This change in accounting principle increased 1986 net income by approximately \$6 million or \$.29 per share. In accordance with SFAS 87, 1985 amounts have not been restated.

#### **Earnings Per Share**

Primary earnings per share is based upon the weighted average number of common shares outstanding. Fully diluted earnings per share reflects the dilutive effect of stock options and assumes that the 8\% convertible subordinated debentures (which were called in January 1987) were converted at the date of issue, with earnings being increased for interest expense thereon, net of taxes. The number of shares used in the computations were as follows:

(In thousands)	Primary	Assuming Full Dilution
Years ended December 31		
1987	23,145	23,578
1986	22,381	25,406
1985	22,983	22,983

#### **Cash and Cash Equivalents**

Cash and cash equivalents consist of the following:

		1987		1986
Cash		\$13		\$6
Cash Equivalents		21	1	3
		\$34		\$9

Cash equivalents consist of short-term deposits and highly liquid marketable securities which are stated at cost and approximate market value.

#### Inventories

If the first-in, first-out (FIFO) method of inventory accounting had been used, inventories would have been approximately \$141 million and \$126 million higher than that reported at December 31, 1987 and December 31, 1986, respectively. It is not practicable to separate the inventory into its components because LIFO inventory values are determined principally by the use of the dollar value LIFO method.

#### **Property, Plant and Equipment**

The major classes of property, plant and equipment at cost are as follows:

	1987	1986
Land and improvements to land	\$ 94	\$ 93
Buildings and building equipment	260	251
Machinery and equipment	1,539	1,466
Leasehold improvements	14	13
Construction in progress	100	89
Property, plant and equipment	2,007	1,912
Less accumulated depreciation	1,280	1,192
Property, plant and equipment, net	\$ 727	\$ 720

Leased assets capitalized and included above are not significant.

Maintenance and repairs charged to operations amounted to \$117 million, \$113 million and \$111 million in 1987, 1986 and 1985, respectively.

# **Notes Payable**

maintained. There are no restrictions on withdrawal of funds; however, approximately \$10 million on average is used to satisfy the requirements for compensating balances and to cover commitment fees under credit arrangements. At December 31, 1987 and 1986, lines of credit for short-term borrowings amounted to \$210 million and \$185 million, respectively. Outstanding foreign loans amounted to \$26 million and \$23 million at short-term interest rates ranging from 3%% to 12% at December 31, 1987 and 1986, respectively. Domestic loans of \$15 million at interest rates not exceeding prime were outstanding at December 31, 1986.

Long-term debt, exclusive of current installments, consisted of the following:

	1987	198
Long-term senior debt:		
7.97% notes payable annually through 2002	\$ 94	\$10
81//2% notes payable annually through 1996	47	5
7.75% note payable 1989	20	2
7.95% note payable 1991	10	10
7.11% note payable 1988 (1)	-	11
Note payable annually to affiliated company through 1995		
at interest rate varying with prime	12	-
Industrial development and environmental	-	
improvement obligations:		
payable in 2012 at interest rates which vary		
with short-term tax exempt rates	29	25
payable annually through 2008 at interest rates		
ranging from 6% to rates varying with prime	51	5
Mortgage, capitalized leases and other indebtedness	4	
Total long-term senior debt	267	27
9½% subordinated notes due 1997	125	• -
8%% convertible subordinated debentures due 2008 (2)		9
Total long-term debt	\$392	\$37

In 1987, reclassified to current installments of long-term debt.

(2) In January 1987, prior to the redemption date set by the Board of Directors, substantially all of the company's 81/4% debentures outstanding at December 31, 1986 were converted into approximately 2,700,000 common shares.

Among the provisions of the note agreements are restrictions relating to payment of dividends and acquisition of capital stock. At December 31, 1987, retained earnings of approximately \$280 million were not so restricted.

Annual maturities of long-term debt for the next five years are as follows: 1988, \$24 million; 1989, \$35 million; 1990, \$16 million; 1991, \$26 million and 1992, \$15 million.

#### Interest Expense

Interest incurred totaled \$34 million in 1987, \$33 million in 1986 and \$36 million in 1985, of which \$2 million, \$1 million and \$1 million was capitalized in 1987, 1986 and 1985, respectively.

#### Special Charge

In the third quarter of 1985, the company recorded a pretax charge of \$330 million as part of a major restructuring program. The charge provided for costs associated with the disposition of certain businesses; decommissioning stand-by chemical facilities; writing down facilities and assets, including \$40 million of goodwill permanently impaired by economic conditions; environmental costs associated with discontinued facilities and former disposal sites; and costs of reducing staff and consolidating administrative functions. At December 31, 1987, \$95 million remain accrued for business dispositions, plant closures and environmental costs. During 1987, the balance was increased by \$38 million of recoveries under insurance claims and \$9 million of net gain from the disposition of businesses. The balance was decreased by expenditures of \$40 million provided for under the program.

#### **Interest and Other Income**

In 1986, interest and other income includes a nonrecurring pretax gain of \$24 million (\$17 million after tax) from the sale of surplus land, for which there were no comparable amounts in 1987 or 1985.

#### **Pension Plans**

Essentially all of the company's pension plans are noncontributory final-average-pay or flat-benefit plans and all domestic employees are covered. The company's funding policy is consistent with the requirements of Federal laws and regulations.

As previously stated, the company adopted the provisions of SFAS 87 for domestic plans, retroactive to January 1, 1986. The net pension credit for 1987 and 1986 shown in the following table is not directly comparable with the cost of \$7 million in 1985 because of the significant changes in accounting for pension costs under SFAS 87. The components of net pension credit are as follows:

	1987	1986
Service cost (benefits earned during the period)	\$ 22	\$ 16
Interest cost on the projected benefit obligation	45	44
Actual return on assets	4	(100)
Actual return deferred for later recognition	(68)	40
Net amortization of unrecognized transition asset,		
prior service cost and deferred gain/loss	(7)	(7)
Net pension credit	\$ (4)	\$ (7)

The funded status of the plans is as follows:		
	1987	1986
Accumulated benefit obligation including vested		
benefits of \$485 and \$466	\$ 510	\$ 502
Plan assets at fair value, primarily equity and		
fixed-income securities	\$ 644	\$ 692
Projected benefit obligation for service rendered		
to date	(583)	(572)
Excess of assets over projected benefit obligation	61	120
Remaining unrecognized net asset upon adoption		
of SFAS 87	(90)	(97)
Unrecognized net (gain) loss	17	(39)
Unrecognized prior service cost	2	
Accrued pension liability	\$ (10)	\$ (16)
Weighted average discount rate	81/2%	81/2%
Weighted average rate of compensation increase	8%	8%
Long-term rate of return on assets	10%	10%

The Olin Salaried Pension Plan provides that if, within three years following a nonnegotiated change of control of the company, any corporate action is taken or filing made in contemplation of, among other things, a plan termination or merger or other transfer of assets or liabilities of the plan, and such termination, merger or transfer thereafter takes place, plan benefits would automatically be increased for affected participants (and retired participants) to absorb any plan surplus.

In addition to providing pension benefits, the company provides medical and life insurance benefits to some of its retired employees. Many of the company's present employees may become eligible for such benefits upon retirement from the company. The cost of life insurance benefits is based upon the annual premiums paid and the cost of medical benefits is based on total claims paid. Such benefit costs approximated \$4 million in 1987, \$3 million in 1986 and \$2 million in 1985.

#### **Income Taxes**

Components of pretax income (loss) from continuing operations are as follows:

	1987	1986	1985
Domestic	\$113	\$106	\$(235)
Foreign	14	9	(47)
	\$127	\$115	\$(282)

#### Components of income tax expense (benefit) are as follows:

p	•		
	1987	1986	1985
Currently payable:			
Federal	\$ 20	\$ (7)	\$ (7)
State	6	5	2
Foreign	4	3	3
	30	1	(2)
Deferred-Federal	19	39	(90)
	\$ 49	\$ 40	\$ (92)

#### Components of the deferred tax provision are as follows:

	1987	1986	1985
Accelerated depreciation	\$ 11	\$ 16	\$ 14
Intangible drilling costs	(1)	(1)	(1)
Special charge	1	13	(100)
Employee benefit plans	2	3	_
Leasing activities	7	9	2
Other, net	(1)	. (1)	(5)
	\$ 19	\$ 39	\$ (90)

#### The following is a reconciliation of the statutory Federal rate with the effective tax rate:

(Percent)	1987	1986	1985
Statutory Federal tax rate	40.0	46.0	(46.0)
Investment tax credits	(6.4)	(6.7)	(2.7)
State income taxes, net	3.1	2.5	.4.
Nondeductible special charge items	_		18.4
Income taxed at capital gains rates	(.4)	(4.4)	(.2)
Other, net	2.3	(2.6)	(2.5)
Effective tax rate	38.6	34.8	(32.6)

The cumulative amount of undistributed earnings of foreign subsidiaries, if remitted, would result in a minimal amount of tax because of available foreign tax credits. Investment tax credits amounted to \$8 million in 1987, 1986 and 1985. The Tax Reform Act of 1986 included among its provisions the elimination of investment tax credits, subject to certain transition rules for assets placed in service after December 31, 1985.

Included in the results of discontinued operations and the gain on sale in 1985 are tax provisions amounting to \$5 million and \$12 million, respectively.

# **Supplemental Cash Flow Information**

Cash payments during the years ended 1987, 1986 and 1985 included interest of \$34 million, \$33 million and \$34 million and income taxes of \$19 million, \$14 million and \$23 million, respectively.

Convertible debt of \$98 million in 1987 and \$2 million in 1986 was converted into common shares.

Details of businesses acquired in purchase transactions were as follows:

	1987	1986		1985
Fair value of assets acquired	\$57	\$-	1	\$128
Liabilities assumed or created	26		4	29
Cash paid for aquisitions	31	_		. 99
Less cash acquired				f
Net cash paid for acquisitions	\$31	\$-		\$ 93
Details of businesses sold were as follow	ws:			
	1987	1986		1985
Fair value of assets sold	\$21	\$80		\$115
Liabilities assumed by the purchaser	2	34	-	
Net proceeds from sales of businesses	\$19	\$46		\$115

#### Stock Options

Under terms of the company's stock option plans, options may be granted to purchase shares of the company's common stock at not less than fair market value at the date of grant, and are exercisable for a period not exceeding ten years from that date. Stock option transactions are summarized below:

	Shares	Option Price Per Share
Outstanding at January 1, 1985	685,738	\$10.85 - \$31.44
Granted	312,219	8.10 - 30.82
Exercised	(189,639)	9.50 - 31.44
Canceled	(15,030)	15.88 - 31.44
Outstanding at December 31, 1985	793,288	8.10 - 31.44
Granted	148,380	44.50
Exercised	(164,150)	8.10 - 31.44
Canceled	(33,424)	16.55 - 44.50
Outstanding at December 31, 1986	744,094	8.10 - 44.50
Granted	115,010	49.32
Exercised	(171,755)	10.12 - 44.50
Canceled	(15,401)	20.24 - 49.32
Outstanding at December 31, 1987	671,948	\$ 8.10 - \$49.32

Of the outstanding options at December 31, 1987, options covering 447,598 shares are currently exercisable.

At December 31, 1987, common shares reserved for issuance under these plans were 767,379 and under additional remuneration agreements were estimated to be 217,000

The 1985 grants include 127,509 options issued in exchange for Rockcor, Inc. options outstanding at acquisition date.

#### **Shareholder Rights Plan**

On February 27, 1986, the Board of Directors adopted a Shareholder Rights Plan expiring on February 27, 1996, which is designed to prevent an acquiror from gaining control of the company without offering a fair price to all shareholders. Each right entitles the shareholder to buy 1/2 share of common stock of the company at an exercise price of \$50. The rights are exercisable only if a person acquires 20% or more of the company's common stock or commences a tender or exchange offer for 30% or more of such stock. The company can redeem the rights at \$.05 per right for a certain time period.

If any person acquires 30% or more of the common stock and in the event of certain mergers or combinations, each right will entitle the holder to purchase stock or other property having a value of twice the exercise price.

#### **Segment Information**

Information relative to the various industries in which the company operates appears on **Discontinued Operations** page 21 and is incorporated herein by reference. The following is a summary of information by geographic area:

	1987	1986	1985
Trade sales and operating reven	ues		-
United States	\$1,790	\$1,628	\$1,634
Foreign	140	104	126
Transfers between areas			
United States	42	22	27
Foreign	1	·	. 3
Eliminations	(43)	(22)	(30)
Net sales and operating revenues	\$1,930	\$1,732	\$1,760
Operating income (loss)			
United States	\$ 142	\$ 94	\$ (222)
Foreign	6	7	(47)
Eliminations	1 -	5	. 4
Operating income (loss)	\$ 149	\$ 106	\$ (265)
Assets			
United States	\$1,479	\$1,358	\$1,333
Foreign	129	132	165
Investments in affiliates	137	104	54
Corporate assets	90	94	163
Eliminations	(150)	(143)	(117)
Consolidated assets	\$1,685	\$1,545	\$1,598

Transfers between geographic areas are priced generally at prevailing market prices. Export sales from the United States to unaffiliated customers were \$104 million, \$83 million and \$82 million in 1987, 1986 and 1985, respectively.

#### Acquisitions

In October 1987, the company acquired Aegis, Inc., a leading supplier to the hybrid microelectronics industry. The acquisition was made by Olin-Asahi Interconnect Technologies, Olin's joint venture in ceramic substrates with Asahi Glass Co., of Japan. In November 1987, the company acquired Fabricated Metal Products, Inc., a fabricator of ferrous and nonferrous specialty stamped metal products. Two smaller acquisitions, Image echnology Corporation and Lectranator Corporation, were also made during the year to

complement the chemical segment of the company. The cost of the four acquisitions approximated \$47 million and all were accounted for as purchases. The net assets acquired included working capital of \$4 million, property, plant and equipment of \$8 million, other assets of \$6 million, reduced by long-term debt and noncurrent liabilities of \$3 million. The results of operations for each company since date of acquisition are included in the consolidated financial statements.

In April 1985, the company acquired Rockcor, Inc., an aerospace and defense company, at a cost of approximately \$100 million. The acquisition was financed by \$90 million of variable rate borrowings which were repaid in September 1985. The acquisition was accounted for as a purchase and the results of operations of Rockcor since the date of acquisition are included in the consolidated financial statements.

In 1985, the company disposed of its Ecusta paper and film businesses. The related operations are reported as discontinued operations in the consolidated financial statements. Net sales of the paper and film businesses were \$140 million in 1985 (to date of sale).

#### **Commitments and Contingencies**

The company leases certain properties, such as manufacturing, warehousing and office space, data processing and office equipment and railroad cars. Leases covering these properties generally contain escalation clauses based upon increased costs of the lessor, primarily property taxes, and have renewal or purchase options. In certain cases, the company is obligated to pay taxes, insurance and maintenance. Total rent expense amounted to \$27 million in 1987, \$25 million in 1986 and \$24 million in 1985 (sublease income is

Future minimum rent payments under operating leases having initial or remaining noncancelable lease terms in excess of one year at December 31, 1987 are as follows:

988	\$ 22
989	19
990	14
991	11
992	7
ater years	31
	\$104

There are a variety of legal proceedings, arising out of its businesses, pending or threatened against the company. Based upon information presently available, the company believes that any liability that may result from the proceedings will not materially affect the company's financial condition. The most important legal proceedings are discussed more fully in Item 3, Legal Proceedings in the Form 10-K Annual Report, which is available on request from the company.

# **Quarterly Data (unaudited)**

	First	Second	Third	Fourth	
1987	Quarter	Quarter	Quarter	Quarter	Year
Net sales and operating revenues	\$473	\$486	\$468	\$503	\$1,930
Cost of sales and other charges	347	360	364	384	1,455
Net income	24	22	15	17	78
Per share data:	,				
Net income:			. •		
Primary	1.05	.95	.64	.74	3.38
Assuming full dilution	1.04	.93	.63	.72	3.32
Cash dividends	.40	.40	.40	.40	1.60
Market price*					
High	52¾	545%	561/4	56	561/4
Low	41	475/8	501/4	32%	32%
1986				2	
Net sales and operating revenues	\$461	\$443	\$412	\$416	\$1,732
Cost of sales and other charges	337	337	322	322	1,318
Net income	27	31	9	8	75
Per share data:					•
Net income:					
Primary	1.18	1.38	.40	.40	3.36
Assuming full dilution	1.08	1.26	.40	.39	3.13
Cash dividends	.371/2	.371/2	.371/2	.40	1.521/2
Market price*	:				
High	427/8	491/2	531/4	451/2	531/4
Low Low	345%	371/8	381/4	39%	34%

<sup>\*</sup> New York Stock Exchange composite transactions.

1986 net sales have been restated to include operating revenues previously reported in interest and other income. 1986 results include a gain of \$17 million (after tax) in the second quarter from the sale of surplus land.

# **Management Report on Financial Statements**

# **Report of Independent Certified Public Accountants**

The company has prepared the accompanying consolidated financial statements and related information for the years ended December 31, 1987, 1986 and 1985. Management has primary responsibility for the integrity of the financial statements, which statements were prepared in conformity with generally accepted accounting principles appropriate in the circumstances, based on our best estimates and judgments and giving due consideration to materiality. In our opinion, they contain no material misstatements attributable to fraud or error. The financial information contained elsewhere in this annual report is consistent with the financial statements.

Olin maintains internal accounting control systems designed to provide reliable information and reasonable assurance that assets are safeguarded from loss or unauthorized use, that fraudulent reporting would be prevented or detected and that all transactions are properly authorized. There are limits inherent in all systems of internal control because their cost should not exceed the benefits to be derived. The company believes its systems provide this appropriate balance. The internal control systems are supported by the recruitment and training of qualified personnel, appropriate delegations of authority and divisions of responsibility, and the development and communication of accounting and other policies and procedures. A well-qualified internal audit department evaluates internal accounting control systems and monitors compliance with the company's internal control policies and procedures by visits to our various locations throughout the world. Management believes that, as of December 31, 1987, the corporation's system of internal controls is adequate to accomplish the objectives

Management also recognizes its responsibility for fostering a strong ethical climate so that the corporation's affairs are conducted according to the highest standards of personal and corporate conduct. This responsibility is characterized and reflected in the corporation's code of business conduct, which is publicized throughout the corporation. The code of conduct addresses, among other things, the necessity of ensuring open communication within the corporation; potential conflicts of interest; compliance with all domestic and foreign laws, including those relating to financial disclosure; and the confidentiality of proprietary information. The corporation maintains a systematic program to assess compliance with these policies.

Our independent public accountants are engaged to examine and to render an opinion on the fairness of our consolidated financial statements presented in conformity with generally accepted accounting principles. In performing their examination in accordance with generally accepted auditing standards, they evaluate the effectiveness of our internal accounting control systems, review selected transactions and carry out other auditing procedures to the extent they consider necessary in expressing their opinion on our financial statements. Their opinion appears on this page.

The Audit Committee of the Board of Directors, composed solely of outside directors, meets periodically with the independent public accountants, management and the company's internal auditors to review the work of each and to evaluate matters pertinent to internal accounting controls and financial reporting, and the nature, extent and results of auditing activities. The Audit Committee annually recommends to the Board of Directors the appointment of independent public accountants. The independent public accountants and the company's internal audit department have access to the Audit Committee without management's presence.

Jal W Johnton Jr. Sigurd D. Medhus

John W. Johnstone, Jr. President and Chief Executive Officer

Sigurd D. Medhus Senior Vice President and Senior Financial Officer

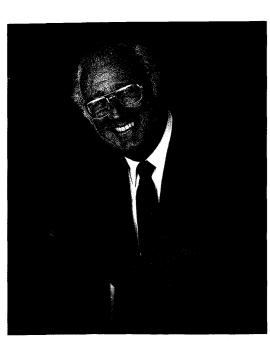
To the Board of Directors and Shareholders of Olin Corporation:

We have examined the consolidated balance sheets of Olin Corporation and consolidated subsidiaries as of December 31, 1987 and 1986 and the related consolidated statements of income, shareholders' equity and cash flows for each of the years in the three-year period ended December 31, 1987. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the aforementioned consolidated financial statements present fairly the financial position of Olin Corporation and consolidated subsidiaries at December 31, 1987 and 1986, and the results of their operations and their cash flows for each of the years in the three-year period ended December 31, 1987, in conformity with generally accepted accounting principles consistently applied during the period except for the change in 1986, with which we concur, in the method of accounting for pensions as described in the notes to the consolidated financial statements.

Part Marwick Main & Co

Stamford, Connecticut January 29, 1988



John M. Henske will retire from Olin Corporation in 1988. He began his career with Olin 19 years ago as head of the Chemicals Group. His outstanding work in that post led to his election as president, chief executive officer and chairman of the board. He held the post of chief executive officer from April 1978 to April 1987, longer than anyone outside of the founding family. Mr. Henske continues as a director of Olin, a position he's held since April 1970.

In 1977, the year before Mr. Henske became CEO, Olin's sales were \$1.5 billion. Less than two-thirds of these sales remain a part of today's business portfolio, an indication of the restructuring of Olin which took place during his tenure. Building on Olin's strengths in chemistry, metallurgy and applied physics, Mr. Henske in 1982 helped establish Olin's three strategic thrust areas: electronic materials and services, defense/aerospace, and water quality management.

Today's Chemical Manufacturers Association embarked on a new direction under Mr. Henske's chairmanship in 1978-79, changing its name from Manufacturing Chemists Association, and developing a greater advocacy role in representing the industry's positions. He insisted that the industry and Olin conduct its business according to the highest moral principles, a concern reflected by his emphasis on safety, environmental and community responsibility.

John Henske's legacy of community service is as impressive as his corporate career. In addition to serving as chairman of the United Negro College Fund, United Way campaigns and as a hospital director, Mr. Henske was the creative force behind the innovative Science Park in New Haven, Conn. Science Park was launched in 1981 on 80 acres donated by Olin and today serves as an "incubator" for over 100 small companies.

Mr. Henske leaves his mark as a well-rounded chief executive whose dedication to the company was matched by his service to the community.

Richard R. Berry Executive Vice President

Robert R. Frederick Former President and Chief Executive Officer, RCA Corporation

Richard M. Furlaud Chairman and Chief Executive Officer, Squibb Corporation

John W. Hanes, Jr. Chairman, Old Port Company, Inc.

Henry H. Henley, Jr. Former Chairman, Cluett, Peabody & Co., Inc.

John M. Henske Chairman of the Board

William W. Higgins Senior Vice President, The Chase Manhattan Corporation and its principal subsidiary, Chase Manhattan Bank, N.A.

Robert Holland, Jr. Chairman and Chief Executive Officer, ROKHER-J, INC.

John W. Johnstone, Jr. President and Chief Executive Officer

Jack D. Kuehler Vice Chairman of the Board International Business Machines Corporation

William L. Read Vice Admiral, U.S. Navy (Ret.)

John P. Schaefer President, Research Corporation

Irving Shain Vice President and Chief Scientist

Robert H. Sorensen Former Chairman, The Perkin-Elmer Corporation

Eugene F. Williams, Jr. Chairman, Centerre Trust Company of St. Louis John M. Henske Chairman of the Board

John W. Johnstone, Jr. President and Chief Executive Officer

Richard R. Berry Executive Vice President

Donald W. Griffin Executive Vice President

Robert L. Yohe Executive Vice President

Joseph M. Gaffney Senior Vice President, Planning and Development

Sigurd D. Medhus Senior Vice President and Senior Financial Officer

Michael E. Campbell Vice President, Human Resources

E. McIntosh Cover Vice President and General Counsel

Richard Hiendlmayr Vice President and Director, Internal Audit

James A. Riggs Vice President and Comptroller

Irving Shain Vice President and Chief Scientist

Richard N. Williams Vice President

Melvin Neisloss Secretary

George B. Erensen Vice President, Taxes and Risk Management

George H. Nusloch II Vice President, Public Affairs

#### Chemicals

Robert L. Yohe, President Corporate Executive Vice President

Leon B. Anziano Vice President, Industrial Chemicals

Patrick J. Davey Vice President, Water Products and Services

Frank A. Eakin Vice President, Manufacturing and Engineering

James A. Mack Vice President, Performance Chemicals

John P. Marano Vice President, Technology

# **Olin Hunt Specialty Products**

Edward B. Pollak, President Corporate Senior Vice President

Pierre C. Schmidt Executive Vice President

# **International Operations**

William M. Schmitt, Vice President Corporate Vice President

Fred N. Breekland Vice President and General Manager

W. Curtis Collyer Vice President and Area Director

Neil W.S. Suggitt Area Director

#### **Olin Interconnect Technologies**

Thomas J. Berardino, President Corporate Senior Vice President

Scott V. Voss President, Mesa Technology

# **Defense Systems**

Donald W. Griffin, President Corporate Executive Vice President

Gerald W. Bersett Vice President and General Manager, Winchester

Angelo A. Catani President, Olin Ordnance

J. Robert Cloninger Vice President and General Manager, Lake City Army Ammunition Plant

Marc A. Kolpin President, Physics International

William W. Smith President, Aerospace

Daniel A. Stern Vice President, Advanced Systems

#### Metals

James G. Hascall, President Corporate Vice President

J. Douglas DeMaire Vice President, Business Planning and Development

Thomas M. Gura Vice President, Marketing

Joseph D. Rupp Vice President, Manufacturing and Engineering

Derek E. Tyler Vice President, Metals Research Laboratories

#### Defense Systems/Metals Staff Services

R. Eugene Bockhorst Vice President, Services

John S. Frew Vice President, Administration

#### **Olin Financial Services**

William A. Strachan, President

# **Transfer Agents and Registrars**

Manufacturers Hanover Trust Co. 450 W. 33rd Street New York, N.Y. 10001 Telephone: (212) 613-7147

Centerre Trust Company of St. Louis 510 Locust Street St. Louis, Mo. 63101 Telephone: (314) 436-9367

# Stock Exchange Listings

Common Stock
New York Stock Exchange
Pacific Stock Exchange
Midwest Stock Exchange

#### **Trustee for Subordinated Notes**

Bankers Trust Company Four Albany Street New York, N.Y. 10015 Telephone: (212) 250-6112

#### **Dividend Reinvestment Service**

Olin makes a Dividend Reinvestment Service available to its shareholders. For information, write to: Manufacturers Hanover Trust Co. Dividend Reinvestment Dept. P.O. Box 24850 Church Street Station New York, N.Y. 10249

# **Annual Meeting**

The annual meeting of the shareholders will be held on Thursday, April 28, 1988, at 10:30 a.m., local time, at the headquarters of the corporation, 120 Long Ridge Road, Stamford, Conn.

#### Trademarks

Italicized words identifying products in this report are trademarks or servicemarks of Olin Corporation or its subsidiaries or affiliates.

# **Corporate Headquarters**

120 Long Ridge Road P.O. Box 1355 Stamford, Conn. 06904–1355 Telephone: (203) 356-2000.

#### Form 10-K Available

A copy of Olin's Form 10-K, containing additional information of possible interest to shareholders and filed with the Securities and Exchange Commission in March each year, will be sent without charge to any shareholder who requests it.

Write: Linda E. Gaza Director, Investor Relations Olin Corporation P.O. Box 1355 Stamford, CT 06904-1355

#### Credits

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**Certified Public Accountants** 

Peat Marwick Main & Co.

Stamford Square 3001 Summer Street Stamford, CT 06905

October 31, 1988

The Board of Directors Olin Corporation:

We have examined the consolidated financial statements of Olin Corporation and consolidated subsidiaries (the Company) as of and for the year ended December 31, 1987 and have issued our report thereon dated January 29, 1988. We did not perform audit tests for the purpose of expressing an opinion on the individual amounts such as those enumerated below.

We have applied certain agreed-upon procedures (as discussed below) to certain data listed under Alternative II in your financial responsibility letter to the Connecticut Reversion Analyst, USEPA. Our procedures and findings were as follows:

1. We compared and agreed tangible net worth of \$582,000,000 to the amount determined as follows:

Stockholders' equity on the December 31, 1987 consolidated balance sheet included in the Company's 1987 Annual Report to Shareholders

\$ 700,000,000

Less goodwill, patents, trademarks, and noncompetition agreements included in the Company's general ledgers

118,000,000

\$ 582,000,000

- 2. We compared total operating assets in the U.S. of \$1,479,000,000 to the amount shown on the December 31, 1987 note to financial statements captioned "Segment Information" on the line "Assets United States" included in the Company's 1987 Annual Report to Shareholders and found them to be in agreement.
- 3. We determined that the Corporation's U.S. operating assets of \$1,479,000,000 at December 31, 1987 is less than 90% of the consolidated assets as follows:

Total U.S. operating assets per item 2 above

\$ 1,479,000,000 (A)

Total consolidated assets on the December 31, 1987 balance sheet

1,685,000,000 (B)

(A)

87.8%

The Board of Directors Olin Corporation October 31, 1988

Because the above procedures do not constitute an examination made in accordance with generally accepted auditing standards, we do not express an opinion on any of the individual amounts or items referred to above. Based upon the procedures performed, nothing came to our attention which would cause us to believe that the above data requires adjustment. Had we performed additional procedures, matters might have come to our attention that would have been reported to you. The procedures enumerated in this letter were performed solely to assist you in submission of your letter to the Connecticut Reversion Analyst, USEPA as discussed in the second paragraph. This letter is not to be used for any other purpose.

Leax Marwich Mara & C.



**Certified Public Accountants** 

Peat Marwick Main & Co.

Stamford Square 3001 Summer Street Stamford, CT 06905

October 31, 1988

The Board of Directors Olin Corporation:

We have examined the consolidated financial statements of Olin Corporation and consolidated subsidiaries (the Company) as of and for the year ended December 31, 1987 and have issued our report thereon dated January 29, 1988. We did not perform audit tests for the purpose of expressing an opinion on the individual amounts such as those enumerated below.

We have applied certain agreed-upon procedures (as discussed below) to certain data listed under Alternative II in your financial responsibility letter to the Director, Hazardous Materials Management Unit, Connecticut Department of Environmental Protection. Our procedures and findings were as follows:

We compared and agreed tangible net worth of \$582,000,000 to the amount determined as follows:

Stockholders' equity on the
December 31, 1987 consolidated
balance sheet included in the
Company's 1987 Annual Report to
Shareholders

\$ 700,000,000

Less goodwill, patents, trademarks, and noncompetition agreements included in the Company's general ledgers

118,000,000

\$ 582,000,000

- 2. We compared total operating assets in the U.S. of \$1,479,000,000 to the amount shown on the December 31, 1987 note to financial statements captioned "Segment Information" on the line "Assets United States" included in the Company's 1987 Annual Report to Shareholders and found them to be in agreement.
- 3. We determined that the Corporation's U.S. operating assets of \$1,479,000,000 at December 31, 1987 is less than 90% of the consolidated assets as follows:

Total U.S. operating assets per item 2 above

\$ 1,479,000,000 (A)

Total consolidated assets on the December 31, 1987 balance sheet

1,685,000,000 (B)

(A) =

87 Q%



The Board of Directors Olin Corporation October 31, 1988

Because the above procedures do not constitute an examination made in accordance with generally accepted auditing standards, we do not express an opinion on any of the individual amounts or items referred to above. Based upon the procedures performed, nothing came to our attention which would cause us to believe that the above data requires adjustment. Had we performed additional procedures, matters might have come to our attention that would have been reported to you. The procedures enumerated in this letter were performed solely to assist you in submission of your letter to the Director, Hazardous Materials Management Unit, Connecticut Department of Environmental Protection as discussed in the second paragraph. This letter is not to be used for any other purpose.

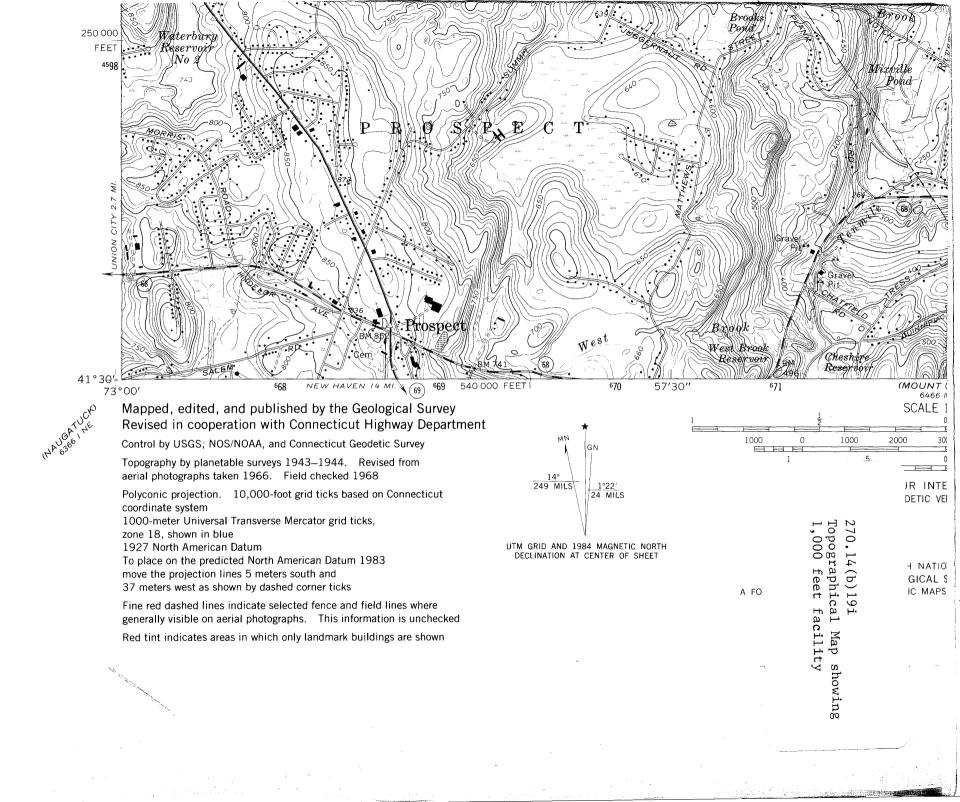
Rest Marwick Main & Co.

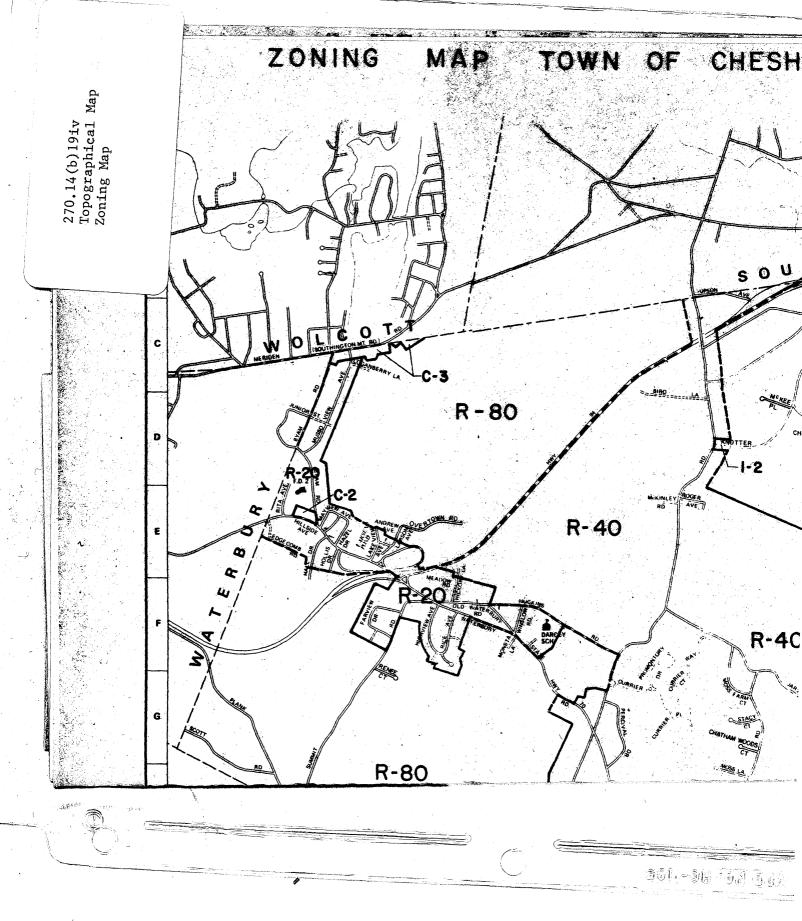
# 270.14(b)(19) Topographical Map

Olin Cheshire Research Facility requests a waiver from the map scale and contour requirements of 270.14(b)(19), as no map of that particular contour interval could be obtained. Instead, a USGS map of the site is being substituted and has 1,000 feet around the facility defined. The scale is 1 inch equals 2,000 feet and is the Southington, Connecticut Quadrangle.

- i. The map scale and date are indicated on the USGS map. Attachment 270.14(b)(19)i
- ii. Olin's Cheshire Research Facility is at an elevation of 144 feet and is not in the 100 year flood plain. The flood plain elevation is 137 feet and is a part of the Judd Brook and Ten Mile River watershed area. See attachment 270.14(b)(12) 1 in the flood plain section.
- iii. Surface waters and intermittent streams are located on USGS map and show that we are less than 1,000 feet from the Ten Mile River. This river flows in a north to south direction.
- iv. Surrounding land uses are indicated on a Cheshire Zoning map attachment 270.14(b)(19)iv. Zoning is industrial 1-2C and residential R-40.
- v. Wind rose data from Bridgeport Sikorsky Memorial Airport is submitted as attachment 270.14(b)(19)v.
- vi. All maps have a scale and orientation for north indicated on them. (Exception is zoning map of Cheshire!)
- vii. The legal boundaries of the facility are indicated on Cheshire Certified Plot Plan attachment 270.14(b)(19)vii.
- viii. The security systems are described in the section on security 270.14(b)(4).
  - ix. There are five wells on the property of Cheshire Research Facility. Five wells have been sealed and are located in the main building of the Research Center. There are no active wells within 1,000 feet of the Olin property. There are two inactive groundwater monitoring wells on the Bendix property, and these are within 1,000 feet of Olin's property.
    - x. Location of hazardous waste storage areas and topography of the Olin property can be found on attachment 270.14(b)(6)1 (prepardness and prevention). This map also shows sanitary sewers and storm drains for the property, fire control equipment and internal roads (ingress and egress).

- xi. There are no barriers for flood control known within 1,000 feet of the Olin Cheshire Research Facility.
- xii. Attachment 270.14(b)(6)1 (prepardness and prevention) shows the location of the current storage facilities on the Olin Cheshire Research Facility.





- Tape readability is guaranteed to original purchaser provided that the National Climatic Data Center furnished the blank tape and the user attempts to read the tape and notify NCDC of any problems within 60 days of receipt.
- The program you are receiving is a copy of an active piece of software on the UNIVAC 1100 System used by the National Climatic Data Center for its internal use and as such is in the public domain. The fee paid to receive this program covers only the cost of transfer of the source code to your desired output medium. Since this center is not a software broker, we do not:
  - a. Provide support in making the program run on your system.
  - b. Automatically provide possible changes or updates made to enhance the program.
- The National Climatic Data Center considers that, in some cases, the reported values on Cooperative Climatological Observation forms, January 1982 and later, are questionable due to recording errors. The best estimates of observed values may be obtained from our Climatological Data publication or from our digital data files.
- The National Climatic Data Center considers the accuracy of the solar radiation data you have requested to be questionable. The best estimates of observed solar radiation consist of data prior to 1981 which may be obtained from our magnetic tapes in the SOLMET format.
- IF PAYMENT IS MADE BY CHECK, IT MUST BE DRAWN ON A UNITED STATES BANK OR A U. S. BRANCH OF A FOREIGN BANK, PAYABLE IN UNITED STATES CURRENCY. INTERNATIONAL MONEY ORDERS OR UNESCO COUPONS ALSO ARE ACCEPTABLE AS PAYMENT. PLEASE INCLUDE PAYMENT FOR ANY RUSH OR SPECIAL MAILING CHARGES WHEN REQUIRED. IF YOU PLAN TO SEND VIA "ELECTRONIC TRANSFER", WIRE DIRECTLY TO: FIRST UNION NATIONAL BANK, CHARLOTTE, NC; ROUTING TRANSIT CODE 0530-00219. PLEASE ADD AN ADDITIONAL \$6.50 TO YOUR ORDER FEE TO COVER FIRST UNION'S SERVICE CHARGE.
- Since no weather records are received for your specified area, we are substituting available data of the type desired from the nearest reporting station. Because of the distances involved or differences in terrain features, these data may not be completely representative.
- 8 If assistance is needed in the application of the data on these records, a list of addresses for private consulting meteorologists may be obtained from:

The American Meteorological Society 45 Beacon Street Boston, MA 02108

9

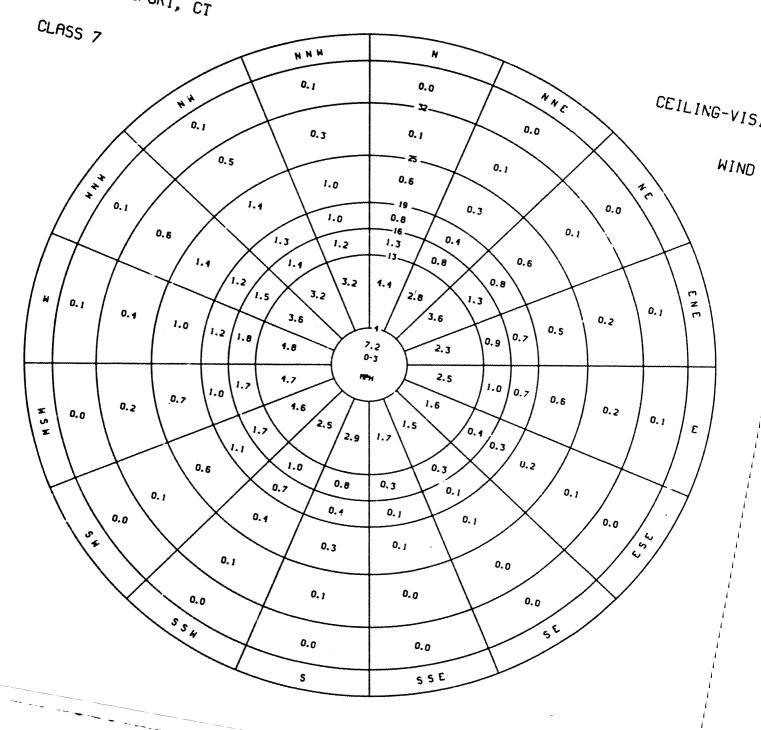
#### URGENT

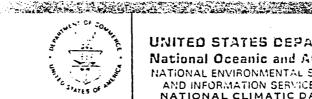
Regulations will not permit the National Climatic Data Center to absorb cost for services provided customers on a reimbursable basis. UNTIL WE RECEIVE PAYMENT, OR JUSTIFICATION FOR NON-PAYMENT WE WILL NOT BE ABLE TO HONOR FUTURE REQUESTS FOR DATA. Should your records show that payment has been made for this invoice, please send proof of payment. We prefer to remove your name from our past-due accounts RATHER THAN TURN IT OVER TO THE NOAA OFFICE OF GENERAL COUNSEL FOR COLLECTION.

10 Excess payment may be used as automatic credit on future orders or refunded upon request only.

(NOTE: Customer number must be used when placing an order, when checking on order status, or when requesting a refund.)

BDR BRIDGEPORT, CT





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL ENVIRONMENTAL SATELLITE, DATA,
AND INFORMATION SERVICE
NATIONAL CLIMATIC DATA CENTER
FEDERAL BUILDING
ASHEVILLE, NORTH CAROLINA 28801

# Use of Annual Wind Rose for Climatic Applications

The attached wind rose was originally prepared for the FAA for aviation related applications. The graph depicts wind direction versus wind speed during all weather conditions at a particular airport site. Extreme caution must be taken if this graph is used for other applications for the following reasons:

- 1. The graph is an annual distribution and does not take into account seasonal or monthly variations in wind speed and direction.
- 2. The graph does not take into account daily variations in wind speed and direction. For example, at most coastal locations a land-sea breeze is common during fair weather. During the day at Daytona Beach, Florida, 50.2 percent of all winds are easterly, while 35.3 percent are westerly. At night 33.4 percent are easterly, while 41.8 percent are westerly. Also, during the day 4.0 percent of all winds are calm compared to 12.9 percent at night.
- 3. The graph is for a particular airport site. Depending upon topography, the wind climate could be entirely different only a small distance away.

These problems could have serious implications if the annual graph is used for applications of short duration (hours, days, months). However, if the application is for time periods greater than a year, the attached graph is representative.



# WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS

January 1981

This report has been prepared by the U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data and Information Service, National Climatic Center, Asheville, North Carolina for the Office of Aviation Policy and Plans, Federal Aviation Administration under Interagency Agreement No. DOT-FA79WAI-057. The contents of this report reflect the views of the contractor, who is responsible for the facts and accuracy of the data presented herein, and do not necessarily reflect the official views or policy of the FAA. This report does not constitute a standard, specification or regulation.

#### INTRODUCTION

Summary tables and graphs have been prepared to assist the FAA in the application of establishment criteria for precision and non-precision approach and landing aids. These tables and graphs depict wind direction and speed under specified ceiling and visibility conditions. This report has been prepared by the National Climatic Center for the FAA under Interagency Agreement No. DOT-FA79WAI-057.

Climatological information for selected airports is presented in 11 volumes:

Volume 1 - New England Region (ANE)

Volume 2 - Eastern Region (AEA)

Volume 3 - Southern Region (ASO)

Volume 4 - Great Lakes Region (AGL)

Volume 5 - Central Region (ACE)

Volume 6 - Southwest Region (ASW)

Volume 7 - Rocky Mountain Region (ARM)

Volume 8 - Northwest Region (ANW)

Volume 9 - Western Region (AWE)

Volume 10 - Alaskan and Pacific Regions (AAL and APC)

Volume 11 - Visibility Time Series for Key Stations

Summary tables and graphs are presented in volumes 1-10. Graphical time series of visibility measurements for key stations throughout the United States are presented in volume 11 to give the reader some insight into the climate variability that can be expected.

# ELEMENT CLASSIFICATION

Twelve tables for each station depict wind direction vs. wind speed distributions. Half the tables show daytime distributions for six ceiling-visibility classes, and half show night-time distributions for the same six ceiling-visibility classes. A graphical depiction of the data in each table is also presented. An additional graph for each station depicts the combined day and night winds for all ceiling-visibility conditions.

Wind direction is grouped according to a 16-point compass (N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW) plus calm. The wind speed groups are 0-3, 4-12, 13-15, 16-18, 19-24, 25-31 and equal to or greater than 32 mph.

The ceiling-visibility criteria are defined as:

CLASS 1 = ceiling equal to or greater than 1,500 feet and visibility equal to or greater than 3 miles.

CLASS 2 = ceiling less than 1,500 feet and/or visibility less than 3 miles.

CLASS 3 = ceiling less than 1,500 feet and/or visibility less than 3 miles, but ceiling equal to or greater than 400 feet and visibility equal to or greater than 1 mile.

CLASS 4 = ceiling less than 400 feet and/or visibility less than 1 mile, but ceiling equal to or greater than 200 feet and visibility equal to or greater than 1/2 mile.

CLASS 5 = ceiling less than 200 feet and/or visibility less than 1/2 mile, but ceiling equal to or greater than 100 feet and visibility equal to or greater than 1/4 mile.

CLASS 6 = ceiling less than 100 feet and/or visibility less than 1/4 mile.

CLASS 7 = all ceiling and visibility conditions; sum of classes 1 and 2; also the sum of classes 1 and 3 through 6.

Time conditions are determined from the onset of civil twilight in the morning to the end of civil twilight in the evening. Civil twilight begins (ends) when the sun is six degrees below the horizon. It covers the somewhat indefinite period before sunrise and after sunset during which natural illumination usually remains sufficient for ordinary outdoor operations. For this report the morning (evening) times of beginning (ending) of civil twilight at a station are determined for the middle of a month. All data within this month are classified as either day or night according to these times.

#### DATA

The data used in the preparation of the climatological tables and graphs were extracted from the National Climatic Center's Tape Deck 1440 Hourly Surface Observations. The data contained in this deck have been digitized from the official observations recorded on station. From about 1948 through 1964 data were digitized for each hour in a day. From 1965 onward only every third hour's data were The tables and graphs in digitized. this report are based on eight observations per day (every third hour) for done to eliminate the data bias problems that would have been created by trying to mix the 24 observations per day prior to 1965 with the 8 observations per day after 1964.

The effect on the climatology of not using all the available data was examined for representative key stations in each region. Monthly day and night distributions were prepared for all ceiling-visibility criteria and wind speed and direction groups using 24 observations per day. A data subset was created by extracting every third observation from the hourly data set. and similar frequency distributions were prepared. The Kolmogorov-Smirnov test was applied to evaluate the hypotheses that distributions using 24 observations per day are statistically the same as distributions using 8 observations per day. The results: of this procedure indicate equality

of distributions. Therefore, no significant information has been lost by basing the climatologies on 8 observations per day.

The tables and graphs are also available on microfiche, and the summarized data are available on magnetic tape. This report presents annual summaries, but monthly summaries can be generated on magnetic tape. Requests for microfiche copies of this report and for data on magnetic tape should be addressed to:

Director
National Climatic Center
Federal Building
Asheville, NC 28801

The requested microfiche copies and/or tapes will be provided at cost.

# TABLE LEGEND

A = number of day (night) observations in a given ceiling-visibility class, wind speed class and direction divided by the total number of day (night) observations in ceiling-visibility classes 1, 3-6, all wind speed classes and directions times 100.

B = number of day (night) observations in a given ceiling-visibility class, wind speed class and direction divided by the total number of day (night) observations in the given ceiling-visibility class and direction times 100.

C = number of day (night) observations of a given direction divided by the total number of day (night) observations in ceiling-visibility classes 1, 3-6 times 100.

D = number of day (night) observations of a given direction divided by the total number of day (night) observations in the given ceiling-visibility class times 100.

E = number of day (night) observations in a given wind speed class divided by the total number of day (night) observations in ceiling-visibility classes 1, 3-6 times 100.

F = number of day (night) observations in a given wind speed class divided by the total number of day (night) observations in the given ceiling-visibility class times 100.

G = number of day (night) observations in the given ceiling-visibility class divided by the total number of day (night) observations in ceiling-visibility classes 1, 3-6 times 100.

100 = summation of column D = summation of row F.

H = average wind speed for the given day (night) ceiling-visibility class and direction.

I = average wind speed for the given day (night) ceiling-visibility class.

J = overall period of record; see station list for actual years of record used.

Note: Ceiling-visibility class 2 is the sum of classes 3-6.

# CEILING-VISIBILITY WIND TABULATIONS

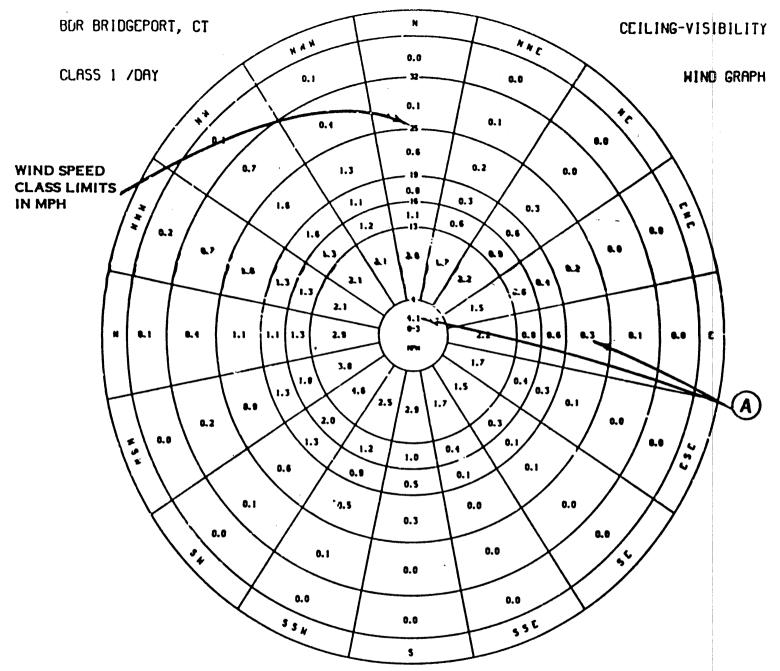
# ANNUAL

STATION NAME: BOR BRIDGEPORT, CT



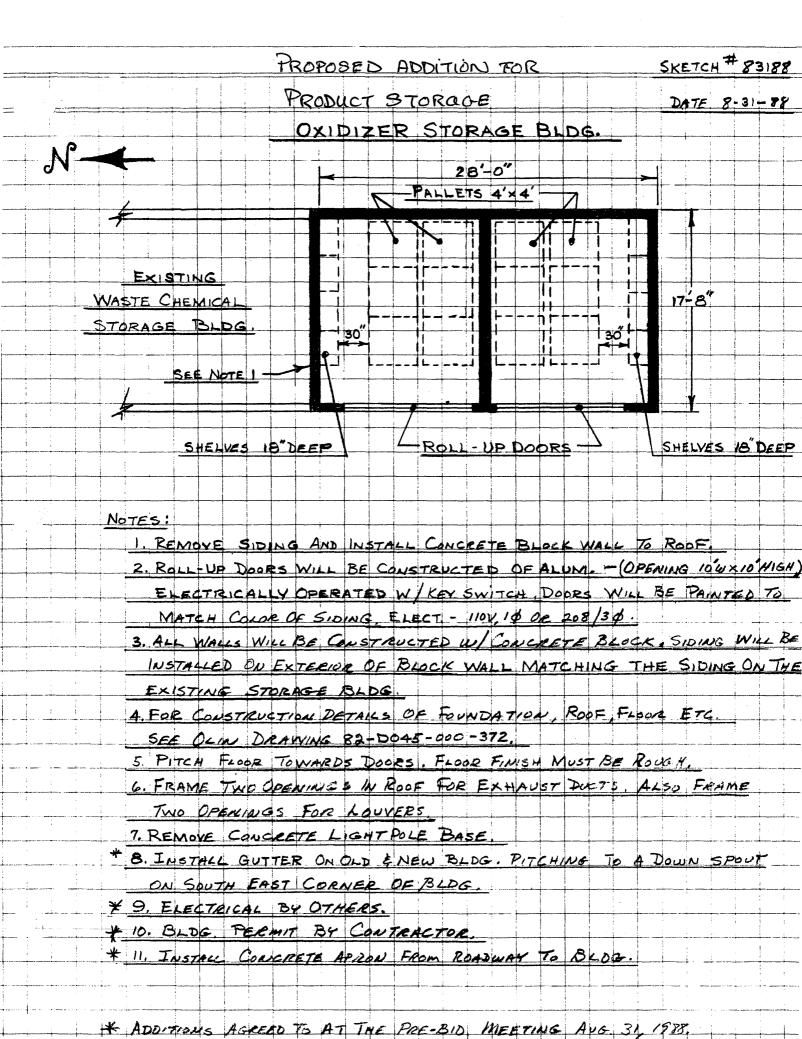
CLASS 1 / DAY .

				02.133	, -				
STATION NUMBER: 94702 NO. OBS.: 29909									.: 29904
	A	B					9	(a)	
	100	SPEED GROUPS (MPH)							
0	0-3	4-12	13-15	16-18	19-24	25-31	32+	TOTAL	AVG HIND
R	A B	A B	A 3	A B	A B	A B	A B	c o	SPEED
N	3: 3	2,6: 3,1	1,1:1,4	ફ: 9	6 . 8	1: 1	0 0	5,5 6,6	12.6
NNE	.2: .3	1,7: 2,1	6: 7	3 4	2 3	1: 1	0. 0	3.2: 3.8	11.3
NE	.3: .4		,9:1,0	.6 .7		0: 0	0 0	4.3: 5.1	11,5
ENE	2: 2	1,5: 1,8		.4 .5	.2: .3	,0: ,1	0: 0	3.0: 3.5	11.7
	.2: .2			.6 .7	3: 4			4.2: 5.0	11.9
ESE	1: 1	1,7: 2,0	4 5	37.1	M 1	.0: 0	0: 0	2.7: 3.2	10.9
\$ E	.2 .2			\ - '\\ \- \P_a	1-11-11-1	.0	.0: .0	5.5 5.6	9.8
5 5 E		1,7:2,0			19-1	.0: .0	9.0.0	2.3: 2.8	9.8
5	. 2: .2	2,9 3,5	1		6	THE PARTY	-0:0	5.0: 5.9	$\frac{11.4}{12.9}$ $\langle H \rangle$
5 S H		2.5 3.0	d3111	13 11 17	·		0: 0	5,3: 6,3	/ \
5 H	. 2: . 3	4.6 5.4	24	1,3, 1,6	16; 7	<del>!!</del>	0	8.8:10.5	12.1
HSH	. 2: . 2			1,3:1,5	9 ,0	2 2	.0: 0	8,1: 9,6 7,1: 8,5	- !3.!
Н	.2: .2	2,9 3,5		1,1:1,4	1,1,1,3	.4 .5	.1: ,1	7,1 8,5	14.4
HNH	.2: .2	2,1: 2,5			1,6:1,9	7: 9	1: .2	7,7: 9,2	16.3
NH	.2: .2	2.1: 2.5		1,6; 1,8 1,1: 1,3	1.3: 1.5	.4: .5	1: 11	6.3: 7.5	15.1
CALH	1,1:1,3	2, 2, 3	- ' • * ' • •	1.1:1.3	1.3: 1.3			1.1: 1.3	
TOTAL		38 2:45 3	16,4 19,5	12 3:14 6	9 8:11 7	3.0: 3.5	.6: .7	84.3: 100	13.0
Land Make Make	1	133,43,3	1.0,4;.3,5	, 3: 1, 0	•		/	7	
(	E F						G	100	I).



A-NUMBER OF DAY (NIGHT) OBSERVATIONS IN A GIVEN CEILING-VISIBILITY CLASS, WIND SPEED CLASS AND DIRECTION DIVIDED BY THE TOTAL NUMBER OF DAY (NIGHT) OBSERVATIONS IN CEILING-VISIBILITY CLASSES 1, 3-6, ALL WIND SPEED CLASSES AND DIRECTIONS TIMES 100.

SAMPLE



OLIN RESEARCH CENTER

CHESHIRE, CONNECTICUT

WASTE MINIMIZATION PROGRAM

W. N. Patterson October 7, 1988

# Olin Corporate/Group Policy on Hazardous Waste (Number 1.10) states:

It will be our goal to steadily reduce the quantity of waste by recovery or by process change.

This policy will be implemented by first minimizing the generation of waste and for those wastes generated, to recover, recycle, or reuse the waste whenever feasible.

# RESPONSIBILITY

It shall be the responsibility of the location manager to implement a waste minimization program at the facility.

# REPORTING

Each location will report to group management, on an annual basis, the progress made in the previous year, the goals for the next year, and future plans for waste minimization.

In addition, waste minimization achievements must be reported to state and federal agencies annually.

#### **OBJECTIVES**

The general objectives of the Research Facility is to minimize the amount of waste generated, and to handle the waste that is generated in an environmentally safe manner, concentrating on recycling and reuse of the wastes.

Specifically, the program will include:

- o Setting of goals at the group and plant level.
- o Written waste minimizations plans.
- o Reporting waste generation and minimization efforts through CSP-53, CMA's Annual Survey and government required reports.
- o Establishing an employee communication system regarding Olin's Waste Minimization Program and efforts similar to Olin's Safety Program.
- o Reducing the number of off-site facilities used for generating waste.
- o Review and change where possible processes to minimize waste generation during the development and design phase.

# The Facility Program will be divided into eight parts:

(1)	Waste Minimization Committee
(2)	Written Plan
(3)	Goals
(4)	Annual Audit

- (5) Reporting
- (6) Communication
- (7) Project Evaluations
- (8) RCRA Unit Elimination

# (1) <u>Waste Minimization Committee</u>

A Committee will be established that will coordinate the facility program and provide technical assistance regarding waste minimization.

This Committee will be responsible for implementing the waste minimization program. Members of the committee will include:

Facility Manager

EAD Specialist assigned to the Facility

Facility individual responsible for waste minimization who will serve as chairperson

Chemists and technicians representing various section group activities

The members of the Committee as of October 1, 1988 are:

J. A. Dreyfuss

K. K. Knollmueller

M. G. Miller

R. J. Raynor

W. N. Patterson

S. J. Oberson

R. P. Alexander

# (2) <u>Cheshire Waste Minimization Plan</u>

# Procedure for Ordering Chemicals

An inventory of all chemicals in each laboratory was taken on

and entered into the computer. Each chemical was
assigned a unique six digit number for future tracking purposes.
Additional information such as vendor name, catalog number, unit
price, reporting quantities and amounts on hand in each laboratory
and stockroom location are included in the data base.

Before any additional chemicals can be purchased for use at the Cheshire facility, a computer search using the program IMPAC must be executed to determine the availability of the particular chemical in the building.

It will be the responsibility of each department manager to authorize certain people to use IMPAC. (Normally the individual who places orders through the CAPPS system.)

When entering the name of the chemical to be purchased into IMPAC, a listing of all locations where the chemical can be found, as well as the amounts will be available. The person requiring the chemical must then contact the various location owners to determine if the material can be obtained for his use. If there is no listing for the desired chemical because it has never been ordered, it will be necessary to obtain a new six digit code number from stockroom personnel who will make the addition to the system. Only if the chemical is not available in house can a purchase order be issued. The requisitioner must certify on the Purchase Order that the material is not available on site for his use and that he is ordering the minimum amount required for his use.

# Surplus Chemicals

When chemicals are no longer needed in the laboratories because of project termination, all usable containers must be transferred to the various storerooms throughout the building, i.e.; B-16 or B-28. It will be the individual's responsibility who places the chemical in storage to update IMPAC with the new location.

# Inventory Update

The chemical inventory of all materials on the premises will be updated on a daily basis as follows:

All chemical shipments received at the loading dock will be entered into the computer by stockroom personnel. In addition to the chemical description, code number and container size, the location to which the delivery was made will be entered. If the material is transferred from the delivery location to another location or is consumed, the owner must make the change in the computer.

A physical inventory of all laboratories and stockroom will be performed annually and the system updated.

# Employee Termination

The laboratories of employees who terminate their employment with Olin will, as part of their exit process, be inspected by the site Environmental Affairs Officer to determine the disposition of all chemicals which will not be used by the future tenant. It will be their responsibility to transfer ownership before the last day of employment at the Research Center.

# Chemical Reduction and Substitution

On going projects will be reviewed on an annual basis to determine if the generation of hazardous waste can be reduced at the source.

A hazard review will be held for each new research program to consider the following:

- o Experiment design which requires the use of smaller amounts of chemicals to accomplish the desired results.
- o Chemical substitution using less hazardous products.
- o Reduce possibilities of spills, leaks, mixing errors, etc.
- o Segregation of waste streams.
- o Recycling, reclaiming of used materials.
- o Treatment by neutralization at the point of production.

# Disposal of Hazardous Waste

In keeping with Olin's policy on hazardous waste (No. 1.10), Olin's Research Center will dispose of hazardous waste in the following sequence:

- 1. Recycle the waste at an authorized recycle facility.
- 2. Incinerate (or fuels blend) all hazardous waste which can be incinerated unless written permission is obtained to do otherwise. Preferentially, incinerable wastes will be sent to Doe Run unless there are valid reasons (i.e. excessive freight, Doe Run's inability to take the waste or timing constraints, etc.) not to use Doe Run and unless written permission is obtained.
- 3. Treat the hazardous waste at a permitted treatment facility to a non-hazardous state.
- 4. Treat the waste at a permitted treatment facility to a less toxic hazardous state. Insure through inspection that the resultant hazardous waste is sent to an Olin approved disposal facility.

- 5. Landfill onsite in a RCRA permitted unit.
- 6. Landfill offsite in a RCRA permitted unit with specific written permission.

Each waste should be reviewed against this sequence to insure that the most environmentally sound, cost effective disposal is chosen. Only those wastes that cannot be effectively disposed by categories 1-4 should be landfilled.

Arrangements should be made to obtain a "Certificate of Destruction" or "Certificate of Incineration" from category 2 above for all wastes except materials sent to Doe Run for incineration. Proper documentation of recycle or treatment should be obtained for categories 1, 3 and 4.

# (3) <u>Facility Goals</u>

The short range goals (1 year) will be based upon the latest CSP-53 Report for Hazardous Waste.

This goal will be to reduce the total amount of hazardous waste produced compared to the previous years' generation.

The long range goal (5 years) should take into account all current and proposed projects, current efforts underway to minimize waste and the effect of potential federal and state regulations.

# (4) <u>Evaluation and Annual Assessment</u>

The Facility will conduct an annual assessment under the leadership of the plant's assigned EAD Specialist.

The assessment shall evaluate each waste stream to determine how much was generated, how it was recycled, treated or disposed of, and a recommendation on future minimization.

# (5) Reporting

The assessment shall be completed by May 31st of each year with copies of the report (prepared by the EAD Specialist) being sent to the Vice President of Environmental Affairs and the members of the Manufacturing Directors of the Waste Minimization Committee.

# (6) <u>Communication</u>

The Facility will set up a communication system for the waste minimization program.

This will include articles in the plant newsletters, award ceremonies, and award incentives when there are noteworthy achievements.

Short term and long term goals will be publicized and results achieved periodically reported to all personnel.

# (7) New Project Evaluation

Each program will be evaluated for waste minimization possibilities during the design phase.

New processes will be evaluated at hazard reviews and a statement regarding waste minimization will be included in the project scope.

# (8) RCRA Unit Elimination

An annual evaluation will be made by the Waste Minimization Committee to determine if the Cheshire Facility should continue to maintain a RCRA waste storage building.

This determination will be made based upon how much waste is generated and whether or not the Facility can function without the unit.